THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

OLD SERIES
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NEW SERIES
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A COMPLETE REINFORCED CONCRETE BRASS FOUNDRY.

There has just been completed in Indianapolis, Ind., a foundry plant for the Langsenkamp-Wheeler Brass Works which is complete in every way, working not only a notable advance in foundry construction, but exhibiting many good points in the design of the actual working foundry.

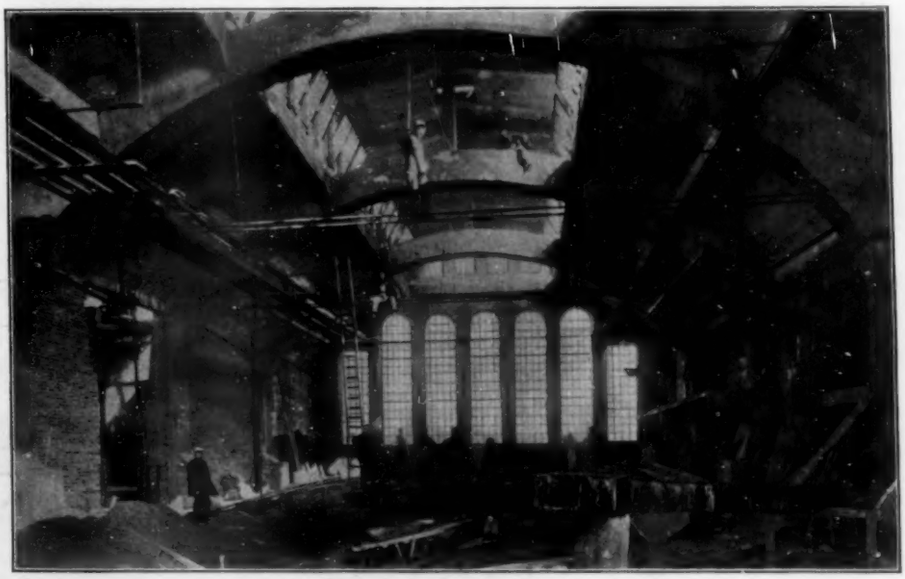
The plant consists of a foundry, core room, furnace room, metal room, cleaning room, polishing room, sand blast room, shipping room, toilet room and machine shop all on the first floor. The second floor has a machine shop, dipping room, pattern storage, main and private offices. The basement under the machine shop is for sand storage.

The foundry is probably the most remarkable one ever built. It is 55 feet wide and 100 feet long, with heavy reinforced concrete arches spanning the entire 55 feet. This makes the roof in the form of an arch, on top of the arches is a very high and wide monitor, on top of the monitor are a number of large ventilators. The roof is only 3 inches thick and the entire roof, monitor and ventilators are built of reinforced concrete.

Hung from the foundry arches are steel brackets, which brackets support a three-ton traveling crane. On the under side of the brackets is hung the steel I-beam trolley track, which serves the foundry with hot metal from the furnace room.

The foundry receives light only from the monitor and ends, and yet the light and ventilation are remarkably good.

The foundry is paved with vitrified brick laid in cement; it will be arranged for bench work, machine molding and floor work.



INSIDE OF THE FOUNDRY.

The furnace room contains one eight-hole stoker furnace, with room for two more.

Four natural draft furnaces are also set for emergencies.

The stoker furnace has capacity for eight No. 100 crucibles. The fuel is soft coal, which is placed in the hopper of the under-feed stoker, which passes it into the fire box.

The crucibles are exposed directly to the action of the gases. This furnace was built under a guarantee that it would melt one hundred pounds of yellow brass for sixty pounds or less of slack coal and would show a metal saving of one per cent. over the common coke crucible furnaces.

There is a coal storage back of the stoker furnaces and a firing pit having a capacity of about 500 tons of soft coal. As the plant is not on a siding, coal wagons drive over the coal storage and drop the coal through coal holes without shoveling.

The core ovens and stoker furnace are fired from the same firing pit. Coke for the core ovens is dropped into a small storage adjoining the soft coal storage.

Sand for the core room is also dropped into the sand storage next the oven coke.

There is a pneumatic lift for hoisting ashes from the ovens and the furnaces and core sand for the core room.

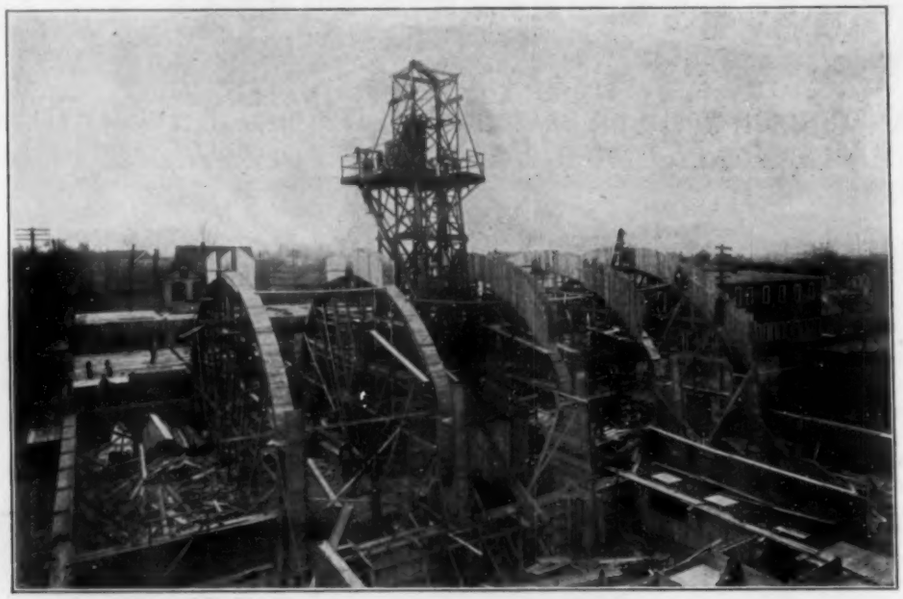
There are two car ovens 5 feet wide, 6 feet long and 6 feet high, with rolling lift steel doors; one rack oven 3 feet wide and 6 feet long, with five steel racks; the opening is closed with a rolling lift steel door.

Two rolling drawer ovens containing five drawers each handle the small cores. These drawers are carried in the rear on differential rolls and in the front by a trolley running on an overhead steel track.

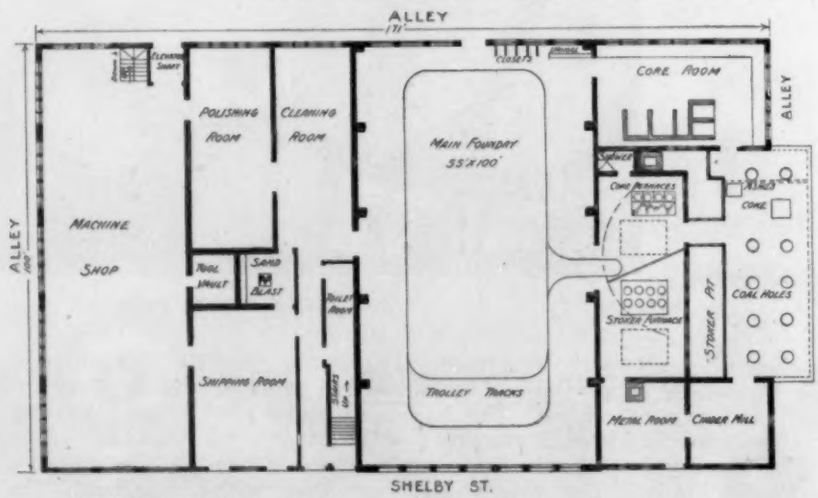
The furnace room is served by a wall crane having an air hoist, which crane will reach two stoker furnaces.

Castings from the foundry pass to the sprue cutters in the cleaning room. The greater part of the castings are then run into the sand blast room.

The sand blast room is arranged for floor and bench cleaning. The sand falls into a hopper; once each day the hopper is emptied into the sand blast machine tank, which is in the basement. The air pressure delivers the sand back through hose to the room. The dusty air is exhausted downward into the room below and then into a stack.



THE CONCRETE ARCHES.



OUTSIDE VIEW AND PLAN.

Waste coke from the coke furnaces goes to the core oven; the ashes from the stoker furnaces are wasted, since no metal can get into them.

The core room contains a battery of ovens fired entirely from one firebox. They are so arranged that any one oven or combination of ovens may be run.

Castings may then pass to the polishing room, machine room or shipping room.

The machine shop is very well lighted and has a full equipment of modern machine tools, also a tool vault.

An elevator takes sand from the basement for the foundry and also delivers castings to the second floor of the machine shop; it delivers patterns to the pattern storage.

The pattern storage on the second floor is large and well lighted.

The main office is located over the shipping room and between the foundry and the machine shop.

The office floor is dropped about 4 feet below the machine shop floor. From the office a full view is obtained of both floors of the machine shop. On the other side of the office, and with a door and windows opening onto it, is a balcony in the foundry. Anyone standing on the balcony gets a bird's-eye view of the entire foundry.

Closets and urinals are not placed in the locker and toilet room, but are at one end of the foundry, so that molders do not leave the foundry floor.

All the machinery is driven by motors from the power house, which is located about 100 feet in the rear of the foundry.

The power house is of reinforced concrete, and is faced with brick, same as the foundry.

It has a basement containing a heating boiler. On the main floor are gas engines and gas producers. Coal bunkers are below. Over an alleyway adjoining the plant is a reinforced concrete water tank containing 14,600 gallons of water.

A Weber reinforced concrete stack completes the power house.

The J. D. Smith Foundry Supply Co., foundry engineers, of Cleveland, Ohio, designed the foundry plant and power house and superintended the construction. They also furnished the furnaces, core ovens, sand blast equipment, cranes and trolley system.

NEW BUFFALO ROLLING MILL.

In the March number of THE METAL INDUSTRY we announced the incorporation of the Buffalo Copper and Brass Rolling Mill with a capital of $800,000 and the incorporators have now advanced sufficently with their plans to state some particulars of the mill. Specifications are being drawn for a 10,000,000 pound capacity per year mill and their first building will be 200 by 500 brick and steel and use Niagara Electric Power. At first sheet copper will be rolled and then brass, German silver and eventually the company will manufacture tubing. The mill will be located near the Buffalo Smelting Works which is the largest copper refinery of the Calumet and Hecla Company and which is located at Black Rock, near the Erie Canal and the Niagara Falls line of the New York Central Railroad. The management estimate that with their advantages of location and power that they can roll copper for half a cent a pound less than elsewhere and that within a radius of 200 miles of the mill there is a sufficent market for the consumption of their output. Among the incorporators are George A. Ray, President of the Geo. A. Ray Manufacturing Company, of Buffalo, N. Y., makers of metal goods and who will be large consumers of the new mill. Another director is Morris B. Patch of the Buffalo Smelting Works. Ground will be broken shortly for the erection of the new mill.

NEW NIAGARA ALUMINUM WORKS AND ROLLING MILL.

The frame work is up on the new reduction works of the Aluminum Company of America, located at Niagara Falls, N. Y., and the rolling mill buildings are completed. The mill which is of reinforced concrete construction with a saw tooth roof 150 by 160 will contain three roughing and six finishing rolls all driven by electric motors. The machinery for it is now being installed and it is expected to be in operation by August 1. It will be used for sheet only.

The reduction works which is a steel and brick structure of 154 by 500 with a concrete roof will have 27,000 horse power. The Aluminum Company own their own generators for furnishing the power for this plant, having their own power house, while the Niagara Falls Hydraulic Power and Manufacturing Company own the turbines and furnish the water power. The reduction works is expected to be reducing metal early in August. The reduction works and rolling mill are located in adjourning buildings, situated at the top of the cliff, below the Falls.

It is estimated that 27,000 horse power of the new plant about equals the horse power of the other plants now in operation at Niagara, which will give the company some 50,000 horse power at Niagara alone. Figuring on a basis of production of 500 pounds of aluminum a year for each horse power, which is a conservative estimate, this will mean a production of 25,000,000 pounds of aluminum per year at Niagara. It is understood that the company has additional horse power for development at Massena, N. Y., and Shawinigan, Canada, to bring their total supply up to 100,000 horse power or 50,000,000 pounds of metal annually. Besides their available power the company is at present utilizing 3,500 horse power in a temporary plant erected on the site of the Acker Process Company, recently burnt down. Therefore there is a promise of relief in the present famine of American aluminum.

IMPROVEMENTS AT THE ELECTRIC SMELTING WORKS.

The Electric Smelting and Aluminum Company, of Lockport, N. Y., the pioneer manufacturers of alloys by the use of the electric furnace, have built a new concentrating building of stone 30 by 70 which will be used for concentrating ores and drosses. Another improvement is a two story laboratory building 35 by 100 of stone, concrete and steel. This building will be absolutely fire-proof, having a concrete roof and floors and will contain all of the physical and chemical apparatus necessary for the testing, assaying and analyzing of ores and metals. The Electric Smelting Company owns 6¼ acres alongside the power canal, Lockport, only half of which is as yet built upon. They manufacture Silicon Copper, Aluminum Bronze, Silver Bronze and special alloys.

The Chamber of Commerce of Hamburg has called a meeting of German metal dealers for the purpose of organizing an exchange for trading in metals. The object is to become independent of the metal exchanges of London and New York. Dealers in zinc have projected the establishing of a zinc exchange at Berlin, and the Berlin Mercantile Guild, while favoring this movement, proposes the inauguration of a metal bourse at Berlin.

THE NEW BRASS ASSOCIATION.

The new Brass Association which is to be organized at Philadelphia, on Wednesday, May 22d, at 10 a. m., at the Second Regiment Armory, is attracting so much attention that we herewith present our readers the portraits and sketches of Charles J. Caley and Dr. Richard Moldenke, who have acted as temporary president and secretary of the association during the past year.

A feature of particular advantage to the new association is that it will meet in connection with the American Foundrymen's Association, and therefore will have all the experience of that successful organization upon which to build its own society. Members of the established association, who are more interested in brass than iron, will naturally associate with the brass men and will attend the brass meetings; while at the same time they will have all the privileges offered by the iron foundry society. These privileges at Philadelphia will be many, for there is to be a valuable exhibit of foundry appliances and supplies, which will be an education in itself. There will also be interesting and valuable papers on the latest practice—and it is to be hoped the brass men themselves will be heard from in this respect—and last, but not least, there will be entertainment, instruction and fun for everybody. The instruction includes a visit to several large plants, and the fun will develop at a shad dinner on the Delaware, and a trip to Atlantic City.

With all these attractions, to say nothing of the advantages of meeting fellow craftsmen, brass men should be present in goodly numbers on Wednesday morning, 10 o'clock, Second Regiment Armory, Philadelphia, Pa.

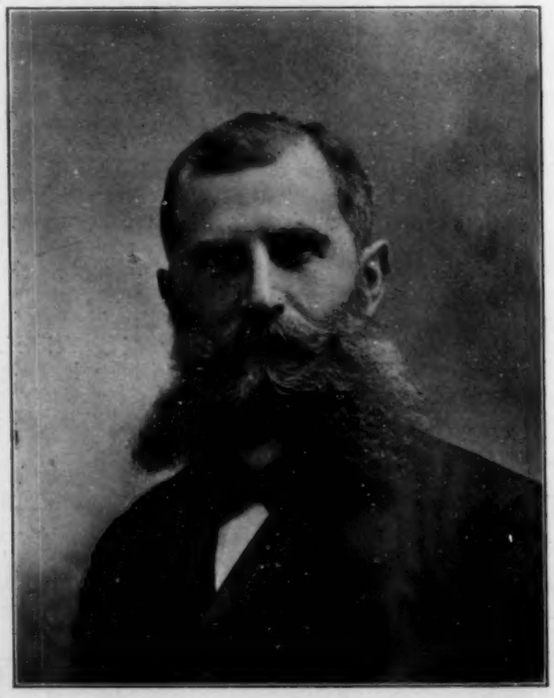
CHARLES J. CALEY.

Mr. Caley is a self-made man, and has been identified with the hardware business since he was small. He was born in Jersey City in 1863, but moved with his parents to Norwich when two or three years of age, when he went to work in the Norwich Lock Shop. He remained there eleven years. As a boy he worked at a bench, and when he left to accept a position with the Sargent Co., at New Haven, he was foreman of the padlock department. He remained with the Sargent people five years as foreman of the lock department, when he left to enter the employ of Yale & Towne, at Stamford. He was a contractor there and general foreman of the lock and hardware departments. After remaining there nine years he re-entered the employ of the Sargent people as a contractor in the hardware department. He left Sargent to come to New Britain, Conn. He was general superintendent of Russell & Erwin Mfg. Co. for three years, and was made general manager in 1906.

Mr. Caley is a member of the American Society of Mechanical Engineers, vice-president of the American Foundrymen's Association, chairman of the new Brass Foundrymen's Association, an ex-officer in the New England Foundrymen's Association, and recently elected a member of the committee on weights in the same society; vice-president of the Russwin Land Corporation, of New Britain, a trustee of the New Britain Lodge of Elks and a past master of the Ancient Order of United Workmen.

Mr. Caley has been remarkably successful as an inventor, and in the past few years has received letters patent for nearly 40 inventions, along lines covered by his business. These have all been of an extremely practical nature, and are now extensively used.

CHARLES J. CALEY, TEMPORARY PRESIDENT.



DR. RICHARD MOLDENKE, TEMPORARY SECRETARY.

DR. RICHARD MOLDENKE.

Dr. Moldenke was born in Watertown, Wis., in 1864, where his father was a missionary, sent by the German Government among the pioneers of the then Northwest during the Indian uprisings, and who afterward became the head of the Lutheran Church of America. He moved to New York City early and was educated there, graduating from the Columbia University School of Mines in 1885 as a mining engi-

neer, and later received the degree of Doctor of Philosophy from the same university.

Dr. Moldenke afterward became Professor of Mechanical and Electrical Engineering at the Michigan Mining School, but soon resigned, preferring the turmoil of active life to which he had been accustomed since his youth.

In 1890 he entered what became his life work in the foundry, beginning at the bottom in one of the largest malleable castings works of the world, and by long and patient investigation, during which time he made some 225,000 tons of castings, learned something of the art of casting iron.

In 1900 he assisted in the formation of the Pennsylvania Malleable Co., of Pittsburg, and built that well-known establishment, leaving it only to care for an estate in New York on the death of his father-in-law, who was one of New York's large property holders.

Dr. Moldenke is best known throughout the foundry world as the secretary of the American Foundrymen's Association, which he became in 1900, and to which he has been re-elected yearly ever since. In a quiet way he has helped in the great revolution of the foundry industry, and ranks as one of the first authorities on the metallurgy of cast iron.

From his early days in the U. S. Coast Survey, and later on mining expeditions, in furnace investigations, etc., he has been constantly facing hardships and danger, and hence has kept a well trained mind always bright through association with other kindred pioneers in the country's advance.

Dr. Moldenke is well known also as a consulting metallurgist, and is kept busy advising on new installations, processes, and besides being in the directory of a number of manufacturing and mining enterprises, is also active in the clean end of the politics of his State, New Jersey. He was recently appointed by President Roosevelt a member of the U. S. Advisory Board for the Geological Survey and Forestry Bureau, looking after the interests of the foundry industry so far as that is affected by the heavy drain on our mineral resources.

Dr. Moldenke is the author of many papers on foundry practice, is a well-known speaker at the various foundrymen's gatherings, and from the rich fund of his experience is always ready to help where he can. While extremely busy with his various interests, he still finds time to keep up his investigations, and has installed a little foundry in the cellar of his Baronial Castle at Watchung, N. J., which home forms a rendezvous for visiting foundrymen.

Dr. Moldenke is a member of the great engineering societies of America and Europe, besides being an honorary member of various American and European Foundrymen's associations.

Ceylon Plumbago Statistics state that importations of this material increased 7,000 tons for the period of January 1st to March 18th of 1907 over the same period of 1906, being 55,000 tons last year and 62,000 tons in 1907. Both Europe and America are buying more and prices are steadily advancing.

Japan is becoming a larger buyer of Ceylon graphite, having taken 1,400 tons for the first three months of 1907, against 50 tons for the same period of 1906.

Reports of the alloy "Alzen"—2 aluminum to 1 zinc—are still going the rounds of the daily press. The alloy was tried out 10 or 15 years ago.

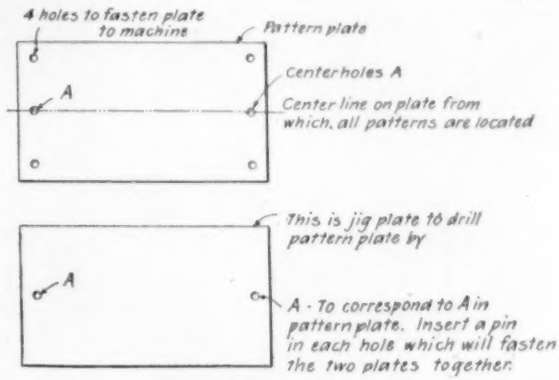
PUTTING HALF PATTERNS ON PLATES.

In regard to the most accurate method of putting patterns on plates when only one-half of a pattern is used, as in the molding of brass stopcocks and faucets, the following methods are followed:

By Bill Smith.

The method of putting patterns on a plate accurately and on one side only is quite simple once you have the idea in mind.

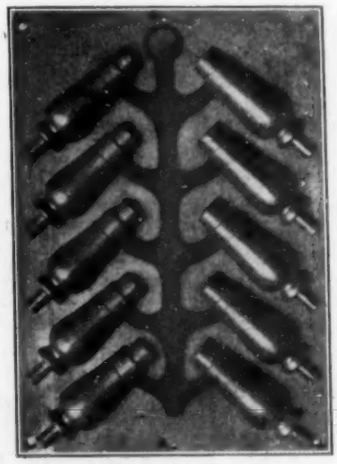
In the first place, the plates are to be used on a molding machine only, and should be of cast iron or


4 holes to fasten plate to machine
Pattern plate
Center holes A
A
Center line on plate from which all patterns are located
This is jig plate to drill pattern plate by
A
A - To correspond to A in pattern plate. Insert a pin in each hole which will fasten the two plates together.

GUIDES FOR HOLES.

of laminated wood. There are many different styles of molding machines on the market, and they all, or almost all, use the same style of plate.

The arrangement in laying out the patterns on the plate is done from an absolute center. The patterns are first laid on one-half of the plate as they are required to be molded. The holes which match the patterns together are used as guides in screwing the



PATTERNS IN PLACE.

pattern to the plate. The operation is then to drill through these holes in the pattern, and through the plate, thus fixing them in their position to be molded. After the plate has been drilled on this one-half side, a metal jig or sheet of brass is used as a templet for transferring the holes to the opposite side of the plate, which has not been drilled up to this time. The method is simple: To use the given center line on the plate, as mentioned in the first instance, as a hinge, upon which this templet is swung from its first place, where it was originally drilled, over to the opposite

side of the plate, where it indexes the holes for the remainder of the patterns.

The rest of the work is then simple. You have the exact duplicate of the holes on both sides of the plate, and it is merely a matter of screwing the patterns to the plate and completing the job by gating up in the regular way. If it is not necessary to have a big gate on the work, they may be gated on one side or to one-half of the patterns only. The method of using patterns on one side of the plate is the same in closing the flask down as in putting the patterns originally on the plate, the whole action being the same as opening and closing a book.

I may state that in the beginning, to determine the center lines of the plate, that a ¼-inch hole be drilled at each end of the plate—on exactly the center line—and that a hole be drilled through the templet plate to match these same holes, and then, if a pin is inserted in these holes, it will be seen that the templet plate will be reversible on these two pins, which act as centers for the same. In this way there can be no shift to the templet. There are other methods of transferring the patterns, but I think that this is about as simple as any.

It will have to be determined by the party in the first part for what machine he wishes to use the plates before he can investigate on the market where to buy plates.

By W. J. R.

The simplest and most accurate method of putting patterns on plates is to purchase from any of the sheet steel houses 3-16 inch thick sheet steel, such as is used for saw blades, etc. Cut this to size of flask or molding machine and drill two ¼-inch holes in center of plate. If for molding machine, a jig is preferred for drilling these holes. Place a transfer plate under the steel plate and pin the plates together. The transfer plate should be of brass. Then place one-half

CENTER HOLES.

the pattern on one side of the plate where desired and drill through the pattern and plates. A good way to fasten the patterns on the plate when located where wanted is with wax. While drilling them take your transfer plate and turn it over to plank side of plate and drill through holes in the transfer plate for the mate of the pattern. Then drill the pattern for this side from the pattern first drilled. Fasten the pattern to the plate with brass rod the same size as the drill used.

THE DROP PRESS IN FLAT WARE OPERATIONS.

By C. W. Cook.

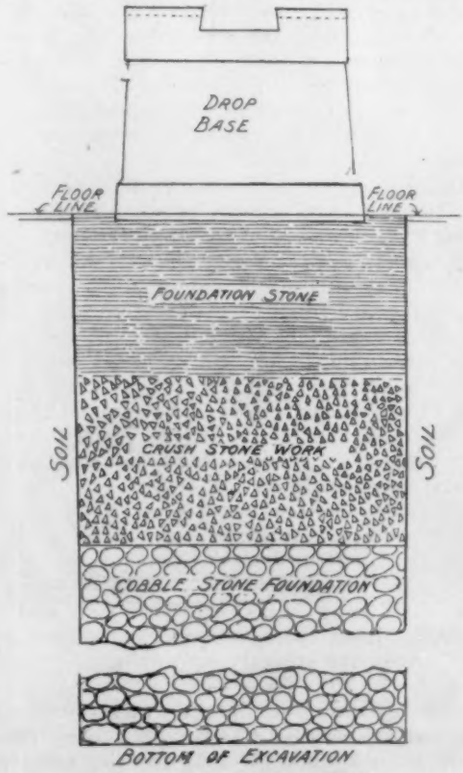
The drop press is a very important factor in the manufacture of German silver flat ware. Many kinds are used by the varied manufacturers of tableware. Some are still using the old style hand and foot drops, but they are fast being discarded for the improved lifters.

In using the hand or foot drop it is necessary for the operator to pull the drop with a belt over a running pulley by hand or with the foot, the friction of the belt over the pulley helping it to lift the hammer for the blow required. But it is hard for the operator, as usually the work is placed under the hammer in the die with one hand while using the other to pull the hammer. Another bad feature of the hand drop is the non-uniformity of the blows on the work, as it requires a very experienced workman to lift the hammer exactly the same height and let it fall with the same speed on every piece of work put under the hammer. The economy of such drop hammers can only be considered when small lots of each pattern are made, or when sometimes successive and varied blows are required. The writer's experience with several styles of drop presses has led him to the conclusion that the best and most economical drop press in use the "Peck Automatic Drop Lifter."

This conclusion has been reached by a thorough study and a varied experience in the past 30 years. Our company is now running one of these drop lifters, which has been nearly in constant use for the past 18 years, and in all that time costing only about three dollars for repairs. The hammer on his lifter weighs 1,000 pounds, and altogether this whole machine today is nearly as good as new.

Three important features are necessary in drop lifters. First, economy in repairs, etc. Second, the speed at which work can be produced, and third, the quality of the work. We find the Peck lifter meets all these requirements.

The successful operation of any drop press is to a large extent due to the manner in which the foundation is put under the base. Many methods have been



DROP PRESS FOUNDATION.

tried with varied success. The old method of placing a large log of wood endwise under the base of the drop and grouting around it to hold it firmly answers

the purpose for a short time, but in most soils the wood soon decays and the log becomes useless; where this method is continued it becomes unsatisfactory, annoying and expensive. The writer has tried several methods of setting drop foundations, and has come to the belief that for economy, stability and good results, our present method is the best for flat ware drops.

Our method consists of excavating down from level about eight feet, and wide and long enough to give good, solid grout foundation, using small cobble stones and Portland cement. This we build up in bottom of excavation about four feet, then we put on about two feet of crushed stone, mixed thoroughly with Portland cement. We then procure a large stone about two feet thick and at least six inches larger than the base of drop at all points. This stone we place on top of the crushed stone, then fill all around this foundation stone with a crushed stone grouting nearly to top of foundation. After the cement work has become hardened, cut out the top of this foundation about one-half inch in depth and same shape as the base of drop, being sure that the cutting out is perfectly level and true. We usually cut this receiving space about one-half inch larger at all points to allow for leading around the base. Now place the iron base in the cavity, being sure it is level and true, and proceed to lead the same. When the hot lead is poured into the space around the base it makes all secure without danger of moving from position as long as the foundation stands firm. Such a foundation, if properly made, insures the best possible resistance to the blows of the hammer and gives best results in bringing up either plain or figured patterns in the dies (see sketch of foundation).

Several methods for holding the dies in drop presses are used, and all may have some good features, but we find this to be the most practical for spoon dies. It consists of what we call a die bed keyed into the top of the drop anvil. This die bed has a cavity long enough and wide enough and of proper depth to receive the die. In the center of the depth of the receiving space we place six screws, two on each side of the length of space, and one each on back and front of same. These screws are of suitable diameter and length to hold the die firmly in place. With the six screws above mentioned we can adjust the die sidewise and endwise to align properly with its mate, which is held in the hammer by means of a key. We find this method of holding the dies for the striking up of flat ware the surest, safest and most practical of any so far devised. The dies used for striking flat ware are of varied shapes. Flat, curved, half curved, etc., to best suit the work desired.

The dies for making flat ware are expensive. Therefore, quite an item to be figured in the cost of producing the goods. They must be made of the best steel suitable for the purpose that will stand the hard usage required of them. Whole pages might be written of experiments which have been made with different steels manufactured to find a make or brand entirely satisfactory in every way. If the cost of the steel only was considered we might all be satisfied, but the expense of cutting a pair of figured spoon or fork dies is another proposition, and many times greater than the cost of the steel.

The treatment of steel in the annealing and hardening process has a great deal to do with the wearing quality of the dies. The writer has seen some costly dies entirely ruined through neglect of simple principles in the handling, and long ago concluded that something more than water and fire was necessary to harden spoon or fork dies to get the best service from them. In the striking up of flat ware we have many difficulties to overcome. First, we must be sure our dies are set correctly in the hammer and die bed, and they must be exactly mitred one with the other, or our pattern on back and front of blank when struck will not be true to each other, and be thus made unfit for the finished piece of work. Second, the operator must keep the dies clean, as if any foreign substance

HAIR MARKS ON FLAT WARE.

adheres to the dies or blank it prevents the figures from coming up full and clear, and also shows bad places in the article. To show how careful the operator must be to have his work perfect when struck up, as an illustration we will take the finest human hair and place it on some plain part of the die and then place our blank to be struck over the hair and let the hammer fall. We find when we look at our blank that we have a cavity or indention many times larger than the diameter of the hair, though practically the same shape. See illustration of spoon handle struck up with indentation the hair has made in blank. The requirements of a good drop press operator are activity, good judgment, good eyesight and positive watchfulness and carefulness to detect irregularities in die or blank.

DRAWBACK ON ALUMINUM PRODUCTS.

The Treasury Department's regulations of November 10, 1906, establishing a rate for the allowance of drawback on sheets, bars, plates and tubing manufactured by the Pittsburg Reduction Company (now the Aluminum Company of America), wholly from imported aluminum in the pig, have been extended, so far as applicable, to cover the exportation of castings, bare and insulated wire or cables, rivets, and other articles manufactured by the company from imported aluminum in accordance with the company's sworn statement.

In liquidation, the quantity of imported aluminum in the pig which may be taken as the basis for the allowance of drawback may equal the quantity stated in the drawback entry after official verification of exported quantities, provided the same shall not exceed the net weight of the exported article, with an addition thereto not to exceed 1 per cent. thereof to cover worthless waste.

Nickel plated watch chains and silver plated watch chains and completed swivels have been classified by the Treasury Department as jewelry.

LAKE COPPER VERSUS ELECTROLYTIC.

By Andrew M. Fairlie.*

(Continued from April issue.)

V.—Electrolytic Refining.

The impurities found in blister copper—or converter copper, as it is sometimes called—may be divided into:

1. Objectionable impurities
   - *a.* Effectually removed by furnace treatment. Types: Iron, sulphur.
   - *b.* Resisting attempts at furnace purification. Types: Arsenic, antimony.
2. Valuable impurities, resisting attempts at separation by furnace treatment. Types: Gold, silver.

The valuable impurities, of course, are of value only if they can be separated from the copper. Since impurities belonging under either class 1*b* or 2 cannot be removed by fire treatment, and since it is desirable to separate them from the copper (though for different reasons), impurities of these two classes are responsible for the development of electrolytic refining.

A general view of this development reveals a curious fact. Electricity has supplied its own demand. The subtle power required, for its generation and transmission, quantities of the purest copper many times greater than the output of native metal having a satisfactory conductivity. The same power now produces, by millions of pounds each month, copper of the purity desired, and not only eliminates those undesirable and fire-resisting elements which seriously impair the electrical conductivity of the red metal, but renders available and marketable the precious metals otherwise uselessly alloyed with the copper.

Most of the electrolytic copper of America is refined in two or three states along the Atlantic seaboard. Among the important electrolytic refiners are the Baltimore Copper Smelting and Rolling Co., Baltimore, Md.; American Smelting and Refining Co., Perth Amboy, N. J.; Raritan Copper Works, Perth Amboy, N. J.; Nichols Copper Co., Laurel Hill, Long Island, N. Y.; and Bahlbach Smelting and Refining Co., Newark, N. J.

Before describing any metallurgical processes used at these plants, a few definitions may perhaps be appropriate. The term *electrolysis* is applied to the decomposition of a chemical compound when exposed to the action of an electric current, and the substance acted upon is called the *electrolyte*. The positive pole, or electrode of the electrolytic apparatus, is called the *anode*, and the negative pole the *cathode*. If an electric current, of suitable strength proportionate to the cathode surface immersed in the electrolyte, is made to pass from the anode through a solution of copper sulphate (bluestone) to the cathode, pure metallic copper will be deposited on the latter. If the anode is a slab of crude copper, and the cathode a sheet of copper, the copper will be dissolved from the anode, and deposited on the cathode, while the impurities in the crude copper, including gold and silver, will fall to the bottom of the tank in the form of mud. The success of the electrolytic process depends on these facts, and while details may differ among the different plants, the fundamental principles used are the same in all.

Blister copper, as poured from the converters described in the preceding chapter, is molded into "pigs" or bars weighing about 200 pounds each. To secure a form better suited for electro-deposition, the pigs are remelted in a reverberatory furnace, and cast into anode plates. These may be cast at the smelting works where the blister copper is produced, or the blister copper may be shipped in the form of bars, to be remelted and cast into anodes at the refinery. The anodes cast at the De Lamar Refinery, Chrome, N. J., are 27½ inches high, 35½ inches broad, and 1½ to 2 inches thick.* Their weight is about 350 pounds. The furnaces used at this plant for remelting the blister copper have a hearth area of 30 by 18 feet, and the hearth is lined one foot deep with a mixture of quartz sand and clay. The anodes are cast with two lugs projecting horizontally at the top, by means of which they are suspended in the tanks. At the De Lamar works the anodes are arranged in sets of fifteen, and are taken to the electrolytic department by a traveling crane. The fifteen plates are lifted together and placed in the tanks containing the electrolyte, which carries in solution 40 grams of copper and 140 cubic centimeters of sulphuric acid per liter—equivalent, approximately, to one and a half ounces of copper and a fourth of a pint of sulphuric acid to each quart of electrolyte. The cathode sheets (38 by 28 inches) are suspended, sixteen in each tank, by means of copper wires, and are immersed to a depth of 26 inches.

The tanks, of which there are 816 at the De Lamar works, are of wood, lead-lined, dimensions being 10 feet long by 3½ feet wide by 3 feet deep. They are arranged in steps in two rows, with a difference in level of 12 inches from one tank to the next. In this way the electrolyte is kept in circulation, flowing from the higher tanks to the lower. The electric current is conveyed by copper leads, from which the electrodes are suspended. A current of 15 to 17 amperes per square foot of cathode area is maintained, and at this rate 350 pounds of copper are deposited on sixteen cathodes in each tank in 24 hours. When the cathodes have been coated with copper to the desired thickness, the entire set of sixteen is lifted at once out of the bath, and rinsed with water. The upper edges having been trimmed off for melting down along with the blister copper, the cathodes are melted in a reverberatory furnace, and cost into ingots, cakes or wire-bars.

The cathode copper before melting is exceedingly pure, the copper percentage running usually as high as 99.93.* Brass manufacturers who are looking for the purest copper could not do better than buy the unmelted cathodes, whose purity and shape are just what the caster wants; trade in cathode copper as such, however, is small. The furnace treatment introduces small amounts of impurities into the metal, and the ingots and wire-bars made from electrolytic copper always show a slightly

*Chemist, Tennessee Copper Company, Copper Hill, Poly County, Tenn.

*Engineering and Mining Journal, Jan. 13, 1906, p. 73.

†Lawrence Addicks: "Electrolytic Copper," *Electrochem. and Met. Ind.*, Jan. 1906, p. 17.

lower conductivity than wire drawn from samples of the cathodes.

Some soluble chloride (e. g., common salt) is usually added to the electrolyte to aid in the precipitation of silver. The silver and gold, as well as less valuable impurities, settle to the bottom of the tank during electrolysis, and this precipitated mud is worked over for the recovery of the precious metals. To collect the mud, the anodes are first brushed off in the bath, and then all of the anodes are lifted at once and transferred to the next higher tank. The sediment is allowed to settle and the liquid is then siphoned off until a depth of only six inches remains in the tank. Bluestone is recovered from the liquid drawn off by crystallization. The whole of the mud is swilled through a hole in the bottom of the vat to a reservoir beneath. After sifting out the large particles of copper, the mud is washed, then boiled with strong sulphuric acid (sp. gr. 1.84) containing a little sodium or potassium nitrate, washed again, and collected in a filter press. The dried cake contains silver, gold, sulphate of lead, besides compounds of other elements, as antimony, arsenic, selenium, bismuth, etc. The mud cake is melted in a reverberatory furnace lined with magnesia brick. The metal obtained carries about 95 per cent. silver, and is cast in molds with conical plugs to produce a thick perforated plate, which is treated with sulphuric acid for the separation or "parting" of the gold and silver.

VI.—Conclusion.

This discussion of the origin and methods of production of North American copper has been necessarily brief. Details which on account of their importance from a metallurgical point of view deserved a chapter have been dismissed with a sentence; those phases of the subject touched upon have been treated in the most fleeting way, and many phases have been omitted altogether. But if by reading these pages some of the consumers of copper have acquired a clearer conception of the difference between lake copper and electrolytic, the object in writing this paper has been achieved.

To sum up, electrolytic copper is derived from ores—chemical combinations of copper with other elements—mined at many widely distant localities; while lake copper is produced from the virgin metal, free and uncombined, and a single district, comprising three counties of Michigan on the southern shore of Lake Superior, is the source of the entire output. The ores of copper require a more intricate mode of treatment than the native metal, but in either case the ultimate product is the same—copper, in cakes, wire-bars, or ingots—and both electrolytic and lake show varying degrees of purity.

Reverting to a subject broached in the opening chapter*—viz., the relative prices of the different grades of copper in the metal market—the explanation of the discount suffered by electrolytic as compared to lake must be sought in the history of American copper. The earliest record of Lake Superior copper production available is for the year 1845, when the gross product for the year was 24,880 pounds.† For years thereafter lake copper had no competitor, and the annual production steadily increased, until in 1881, the year when the principle of electrolysis was first commercially applied to copper refining,‡ the lake output was 54,548,909 pounds.† What the production is to-day the following table shows:§

*This Journal, Jan., 1906, p. 1.
†Horace J. Stevens: The Copper Handbook, 1902, p. 370.
‡Ibid., p. 33.
§Compiled from statistics in *Eng. and Min. Jour.*, Jan. 5, 1907, p. 5.

PRODUCTION OF COPPER IN THE UNITED STATES.
(Pounds.)

	1904.	1905.	1906.*
Michigan	208,329,248	218,999,753	223,800,000
Other States and Territories ...	609,385,757	652,634,492	691,200,000
Total	817,715,005	871,634,245	915,000,000

The early product of the electrolytic refinery proved inferior to lake copper, and the latter maintained its early prestige with reason on its side. Later on, however, as scientific knowledge advanced, the quality of the electrolytic product improved, and to-day its purity (and consequently its conductivity) surpasses that of many brands of lake—a fact now admitted by lake copper men themselves. In tests of relative tensile strength and ductility, on the other hand, certain brands of lake have proved superior to the best electrolytic. This superiority has been attributed to the presence of some impurity in the lake copper, as arsenic, which, though fatal to the conductivity, is known to improve the mechanical properties. If this allegation can be proved true, then the impurity—arsenic or whatever it is—could presumably be deliberately added to pure electrolytic copper to produce a metal of the desired tensile strength and ductility, and lake copper would be robbed of its last claim to superiority.

Of the many uses of copper, the most important are electrical. In view of this fact the conductivity question is paramount. According to Addicks, as little as 0.0013 per cent. of arsenic will cut down the conductivity one per cent. A comparative examination of nineteen brands of lake copper showed that eleven contained more arsenic than the amount specified; that eight of these had a conductivity less than 99 per cent., and that three had a conductivity of 75 per cent. or less. Such facts indicate that sooner or later, when old-time prejudice is overcome, each brand of copper, irrespective of place of origin or mode of production, will be sold on its merits, as determined by the conductivity test.

*Estimated.

TIN FROM THE STRAITS.

Consul General D. F. Wilber, of Singapore, reports on the tin industry of the Straits Settlements as follows: The exports of tin from the Straits Settlements for the first seven months of 1906, as compared with the same period of 1905, showed that shipments to English ports had increased 33 1-3 per cent, and those direct to the United States had decreased 40 per cent. The total exports of tin for 1906, as compared with 1905, show an increase to English ports, of a trifle over 9 per cent, and a decrease in direct shipments to the United States of 12½ per cent. This indicates that during the latter part of 1906 American buyers were gradually increasing their purchases of direct shipments and avoiding the so-called optional shipments via England. The output of tin for the Federated Malay States during 1906 was 48,616 metric tons, against 50,991 tons in 1905. The imports of tin into these States during 1906 was 8,078 tons and in 1905, 7,628 tons, mostly from Siam and Netherlands India.

According to English authorities the world's production of spelter during 1906 is placed at 688,300 long tons, as compared with 647,720 tons in 1905.

THE U. S. STAMPING ACT.

The last Congress passed an act forbidding the importation, exportation, or carriage in interstate commerce or the depositing in the mails of falsely or spuriously stamped articles of merchandise made of gold or silver or their alloys, and for other purposes. This act will go into effect June 13 next.

THE FIRST SECTION provides that it shall be unlawful for any person, firm, corporation or association, being a manufacturer of or wholesale or retail dealer in gold or silver jewelry or goldware, silver goods or silverware, or for any officer, manager, director, or agent of such firm, to import or export into or from the United States, or to deposit or cause to be deposited in the United States mails for transmission, or to deliver to any common carrier for transmission from one State to another, in interstate commerce, any article of merchandise manufactured after the act shall be operative, made in whole or in part of gold or silver, or any alloy of either of these metals, having placed upon it or attached to it any mark or designation indicating that the gold or silver, or alloy, is of a greater degree of fineness than the actual fineness of the metal.

THE SECOND SECTION provides that any article of gold or silver, or an alloy of either, imported or exported, or deposited in the United States mails for transmission, or delivered to a common carrier, the actual fineness of such gold or alloy shall not be less by more than ½ of 1 carat than the fineness indicated by the markings attached to it. An exception is made in the case of watch cases and flat ware, made of gold or its alloys, the actual fineness of which shall not be less by more than 0.003 parts than the fineness indicated by the markings upon the article itself, or the package in which it is contained.

It is provided that in any test for ascertaining the fineness of any article, the part taken for the test shall not contain any solder or alloy of inferior fineness used for brazing or uniting the parts of the article.

It is further provided that the actual fineness of the entire quantity of gold or its alloys, including all solder or inferior alloys used in making the article, shall not be less by more than one carat the fineness indicated by the markings on the article or attached to it.

THE THIRD SECTION refers to articles made in whole or in part of silver or any of its alloys imported or exported, or deposited in the United States mails, or delivered to a common carrier. In such articles the actual fineness of the silver or its alloy shall not be less by more than 0.004 parts than the actual fineness indicated by any mark (other than the word "sterling" or the word "coin") stamped, engraved, or printed upon the article, or upon any tag or label attached to it. And no mark shall be placed upon such article or attached to it, having the word "sterling" or "sterling silver," unless such article or parts thereof purporting to be silver contains 0.925 parts pure silver. And no such article shall be marked with the words "coin" or "coin silver" unless the part purporting to be silver contains 0.900 parts pure silver.

It is provided that in the case of all such articles whose fineness is indicated by the word "sterling" or the word "coin" there shall be allowed a divergence in the fineness of 0.400 parts from the foregoing standards.

It is further provided that any test for ascertaining the fineness of such article according to the foregoing standards, the part of the article taken for the test shall be such portion as does not contain any solder or alloy of inferior fineness.

It is further provided that the actual fineness of the entire quantity of silver in the article, including alloys and parts used in brazing, shall not be less by more than 0.010 parts of the fineness indicated by the markings.

SECTION FOUR provides that articles made in whole or in part of an inferior metal having deposited or plated thereon a plating, covering or sheet, composed of gold or silver, or an alloy of either, and known in the market as rolled gold plate, gold plate, gold filled, silver plate, or gold or silver electroplate, imported or exported, or deposited in the mails, or delivered to any common carrier, shall not be stamped or branded with any word or mark usually employed to indicate the fineness of gold, unless such mark be accompanied by other words plainly indicating that such article or part thereof is made of gold plate. Such articles must not be marked with the words "sterling" or "coin," either alone or in conjunction with other words or marks.

SECTION FIVE provides the penalty. Each and every person, firm, corporation, or association, being a manufacturer of or wholesale or retail dealer in gold or silver jewelry, goldware, silver goods, or silverware, who or which shall knowingly violate the provisions of the act, and every officer, manager, director, or managing agent of any such corporation or association having knowledge of such violation and directly participating in such violation or consenting thereto, shall be deemed guilty of a misdemeanor, and upon conviction in any court of the United States, having jurisdiction, shall be punished by a fine of not more than $500 or imprisonment for not more than three months, or both, at the discretion of the court.

SECTION SIX states that the expression "article of merchandise" used in the act, signifies any goods, wares, works of art, commodity, or other thing which may be lawfully kept or offered for sale.

REGULATIONS GOVERNING SALE OF GOLD AND SILVER WARE IN FRANCE.

Consul-General R. P. Skinner, of Marseilles, furnishes a report on the laws and regulations governing the sale of gold and silver ware in France, which we condense as follows:

Silver ware may be imported upon the payment of duty calculated at the rate of $193 per 220.46 pounds, this being exactly double the duty imposed upon silver ware from countries enjoying the French minimum tariff. In addition, imported silver must conform to the French standards as to fineness, this being also true for manufactures of gold. The first standard for gold is 0.920 of fineness, the second 0.840 and the third 0.750; in each case variations not exceeding 0.003 are tolerated. There are only two standards of fineness for silver, the first 0.950 and the second of 0.800; variations not exceeding 0.005 are permissible. Either of these standards may be used, but it is forbidden to use any lower grade. No manufacture of gold or silver can be placed upon the market without having been first presented to the service of guarantees, and by the officers of that service stamped after a test, with the official mark guaranteeing the degree of fineness. There are 39 of these guarantee bureaus in France, which in the year 1905 examined 23,747,893 articles of gold and silver.

Manufactures of gold or silver of foreign origin are

presented to custom house officials at the frontier, before whom they are declared, weighed, sealed and forwarded to the nearest guarantee bureau, where they are stamped and where they pay fees about equal to those collected upon manufactures of gold and silver of French origin. Gold jewelry comprised in the personal effects of travelers, and silver manufactures, likewise consisting of personal effects, provided they weigh less than 17.63 ounces, are exempt; but if these objects are afterward offered for sale they must be taken to the bureau of guarantee to be stamped, and the usual taxes are then paid. The total value of the gold, silver and platinum jewelry and ware imported into France last year was $3,749,218.

THE HURTFUL EFFECT OF OVER-CONCENTRATION IN PLATING BATHS.

By Chas. H. Proctor.

In the course of a professional plater's career he very often runs up against questions that are of a complex nature; but none can be more so than the various plating solutions and the troubles arising therefrom. This not only concerns the electroplater, but the electrotyper as well. In consultation with several platers recently, who have had their various troubles, I was forced to the conclusion that over-concentration is the direct cause of much of the difficulty the plater encounters. This is particularly true at this time of the year when solutions are worked at the prevailing temperature of the atmosphere. In The Metal Industry columns of Criticism and Comment for last November, the writer notes the comments made by Mr. Nash, and realizes that the trouble he had to contend with was the concentration.

The writer had an opportunity to inspect these deposits and realized that over-concentration was the cause of the crystalline and incoherent deposit, and commented upon the matter. A reduction of 2 degrees in density brought about results that even surprised Mr. Nash with his large experience, and this is very often one of the prime troubles.

Recently the writer was in the plating department of a large silver depositing concern whose silver deposits upon glass and china and other non-conducting surfaces surpass in beauty and finish any other manufacturer in the United States. In answer to the question as to the amount of metallic silver carried in solution, I was somewhat surprised when informed that it was 8 ounces troy to the gallon, and remarked that, in my opinion, solutions of such concentration were unnecessary and trouble was liable to occur as the colder weather approached. Four to five ounces should be the limit for good results. The writer had noted a slight crystalline effect when examining some of the unfinished deposited ware. Shortly after the colder weather came along, and with it the troubles noted—brittle, incoherent and non-adhering deposits. This was caused by over-concentration, due to the lowering of the temperature. A number of such incidents which have occurred recently could be noted.

How many platers consider the fact that with a variation of temperature comes a variation in concentration, although the specific gravity or density in degrees may be the same in the winter as in the summer. Concentration would also remain the same if the temperature of the solution was the same equivalent during the two seasons of the year.

Also, with cold working solutions we find in the winter time crystalline deposits which are made up in their structure with minute globules of metal which seem to have jumped upon each other, instead of the smooth and natural deposit that should result under normal conditions. Higher voltage and stronger current are oftentimes necessary to produce like results.

In the summer time we find the trouble is reversed. As the warm weather approaches we find that a cold solution that has run satisfactorily all winter at the normal temperature will require a lowering of the current for the same amount of surface exposed in the bath. The solutions act erratically, and there is oftentimes a burnt deposit. Too much cyanide is thought of, and in the nickel and acid copper too much acid. Other explanations are sought, but the real trouble is that the baths, which in the winter time were too concentrated, are now too low in metal. The increase in temperaure as summer comes on means an increase in the activity of the bath—in reality producing the effect of too much cyanide or too much acid. Reduce the temperature of the bath to the winter temperature and normal conditions will prevail.

Probably one of the best solutions for noting the cause and effect of variations in temperature is a nickel solution. In the summer a properly composed bath can be run successfully at 7 or 7½ degrees Baumé; but with the same degree of density in the winter time the bath becomes too concentrated, and excessive crystallization takes place, especially upon the anodes. This is due partly to the drop in temperature of the rinsing waters, which are often near the freezing point, and the articles plated become excessively cold. And so it is that dark deposits of nickel are obtained. If the solution is gradually reduced to 5½ degrees, no such trouble occurs, and the bath will give good results, unless it becomes very much too low in temperature. Not only does over-concentration apply to cold working baths, but hot solutions are affected to a great extent as regards density. Solutions of brass, copper and bronze working at 12 or 15 degrees give better results than 18 or 20 degrees. In hot gilding baths solutions weak in gold give the best results.

I know many platers who keep the metallic content of the bath normal almost exclusively with large anode surface, using very little, if any, metallic salts, depending upon the chemical additions made regularly to bring this about.

To silver solutions cyanide and a little 3 per cent. solution of hydrocyanic acid. To brass baths cyanide and slight additions of ammonia and carbonate of soda. For copper baths, cyanide, carbonate and bisulphite of soda. For nickel, small additions of sulphuric acid in water with an equivalent of 3 volumes of 26 per cent. ammonia water to 1 volume of acid, producing ammonia sulphate solution. By this method the solutions are maintained continuously with the addition of water, without using metallic salts, and excellent results are obtained. This avoids over-metallic concentration. The influence of temperature upon the concentration of the various electro-depositing solutions will be found to be the real or indirect cause of many of the troubles that the plater is heir to in the course of his daily operations.

METHOD OF REFINISHING ORMOLU GILT WARE.

By F. J. Frost.

The article is taken apart wherever possible, care being taken to handle the parts of one article before starting on the parts of another.

The article is first polished, which is done only on the raised portions that were originally burnished. A sectional 14-inch diameter muslin buff, a large lathe with a speed of 3,000 revolutions a minute and a good quality of hard rouge are required for this work. It is advisable, when doing the polishing, to keep the article as clean as possible, as the cleansing process preliminary to gilding needs quickness in handling as much as proper material.

After the parts are polished they are wired up in such a manner as to be conveniently handled by the plater. They should be laid out on the bench in bunches, each bunch of wired parts constituting a complete article.

The process of cleaning consists of first passing the article through hot caustic potash, which is contained in a vessel, across the top of which is laid a board upon which the article can be rested while the workman uses a hand mop to dislodge the adhering grease. It is then rinsed well under running water and next washed out in hot soapy water, to which has been added a little aqua ammonia. A sponge is used to remove all perceptible rouge, the sponge being pressed on that part or parts of the article. A rubbing motion is to be avoided, as the ormolu finish is easily scratched. Next rinse thoroughly and then dip into a good cyanide dip solution. After another rinsing the article is ready for gilding.

The solution contains two pennyweights of gold to the gallon, with a slight excess of cyanide, and is used hot. A platinum anode is most suitable and needs to be of a good size, at least as large as an ordinary business card. The article is immersed in the solution first, followed by the anode held in the right hand, which is moved around the article. A perceptible liberation of hydrogen will take place and must show equally on all portions of the article to ensure a uniform color. The article itself is then moved in the solution, continuing the motion of the anode. In less than a minute from the time the article was first immersed a film of gold will be deposited over the entire surface of the article of a beautiful rich color.

Further treatment consists only of rinsing in cold water, then in hot, drying in boxwood sawdust and wiping off with a clean cloth.

PRODUCING A METALLIC COATING ON A NON-VITREOUS SURFACE.

A patent issued to Siegmund Heller and Carl Baumgartl, of Teplitz, Austria-Hungary, relates to ceramic earthen objects which are provided with a metal coating melted or fused on and strengthened or thickened by galvanic deposition. The metal coating is produced by melting onto the ceramic article finely divided gilt-enamel tombac, together with a mixture of enamel and calcined borax. Gilt-enamel tombac is a preparation or alloy which is fireproof up to 1,200° centigrade. It is practical to mix two parts of enamel with one part of calcined borax and one part of finely divided gilt-enamel tombac. Gilt-enamel tombac may consist of substantially three parts of copper, one part of zinc and one-eighth part of gold. This mixture is put onto the ceramic objects to be coated and is burned in—as, for example, in a muffle at a temperature of 800° centigrade. After the article has cooled off the surface of this fused or burned-in coating is ground, abraded or polished, so that a clear metallic surface appears. The article is then placed in a galvanic bath, in which electro-deposition takes place, so that thereby the outer metallic envelop is plated, thickened and strengthened to any suitable degree. The article is then ground and polished. The metal coating thus produced adheres with exceeding firmness to the base.

THE PRODUCTION OF DENSE NICKEL

Deposits by Means of Continuous Filtration.

By Chas. H. Proctor.

The articles recently appearing in The Metal Industry describing automatic conveying in plating operations have no doubt proved highly interesting to many members of the plating fraternity who, on account of the nature of their work, have still to resort to the stationary method of depositing. The mechanical motion as applied to rapid deposits is not new; for more than 25 years various methods have been in vogue, especially in the production of silver deposition and deposits of acid copper.

The mechanical motions applied to some of the automatic plating tanks have reached the nature of a fine art, and very smooth and rapid deposits are obtained with their use.

The rapid deposition of nickel by these methods has not been a commercial success. This is largely due to the fact that so much sediment is always present in the bath and the rapid agitation of the solution causes this foreign matter to settle upon the work, thereby causing a rough and unsightly deposit when finished. This is largely due to the composition of the anodes. If rolled anodes could be successfully employed, solutions of a clearer nature would be the result; but as they do not yield up the metal freely enough, they have to be discarded in favor of the regular cast anode.

A large concern who have made many experiments to produce rapid and clear deposits of nickel have decided to filter their solutions once a week. But, the writer thinks, this plan will not clear the solution from foreign matter sufficiently to produce the surface desired, and the constant removing of the solution entirely does not have a beneficial effect upon it, as many platers are well aware, who clean out their nickel solutions at the end of six months or a year and find that the results are not as satisfactory as previous to the cleaning.

My idea of successful deposits of nickel by continuous filtration while the depositing is in progress can best be performed by one or more mechanical pumps of the beer pump type. These would be inserted at a sufficient depth so that the solution would be continually drawn from the bottom of the tank and before re-entering the bath would be filtered through felt bags usually used for rapid filtering of solutions. The writer believes R. Hoe & Company, of New York City, produce such a pump for agitating purposes, in connection with the electrotype deposits from acid copper baths. The writer thinks this method is well worth a trial by those interested in mechanical plating bath depositing, and the results would be watched eagerly by many readers of The Metal Industry.

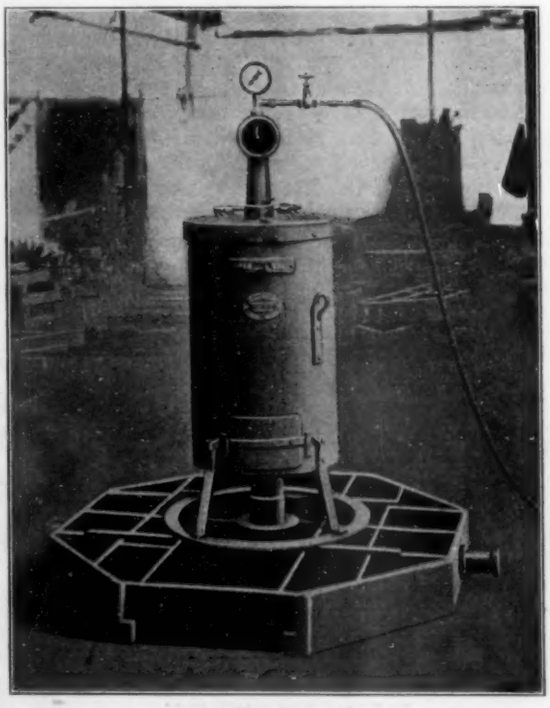
INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE NON-FERROUS METAL INDUSTRY.

DRYING MOLDS IN THE FOUNDRY.

The patent mold drier here illustrated is the result of much experience and experiment in the foundry itself, and its unvarying success justifies the makers, the Tilghman-Brooksbank Sand Blast Company, of 1126 South Eleventh street, Philadelphia, Pa., in recommending its adoption in every foundry where it is desirable to have the molds dried in an economical, convenient and speedy manner.

This apparatus does not require a crane for moving it, as it can be easily carried about by two men. Compressed air is supplied at 20 pounds pressure, and the drier requires approximately 10 cubic feet of free air per minute.



MOLD DRIER.

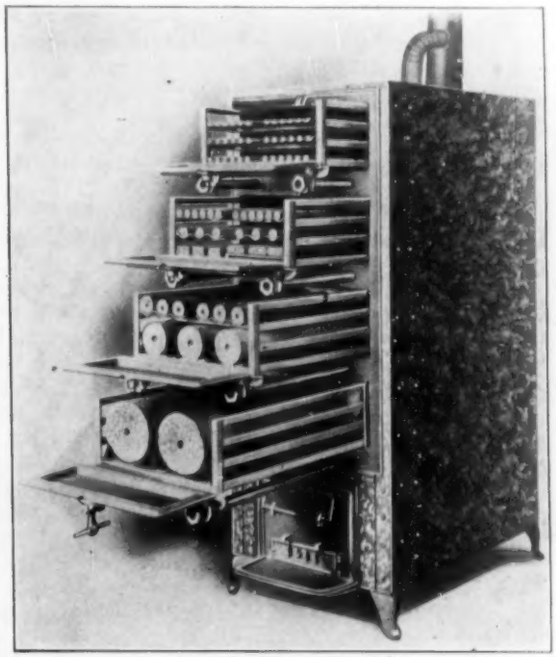
The outer casing contains an inner cylindrical fireplace, which is lined with fire clay. A flat hearth is arranged a short distance from the bottom to support the gas coke stove. When the air is turned on it flows into the casing, part of it going through the top of the inner fireplace and the other part passing through a perforated adjustable ring and down the annular space between the fireplace and the outer casing. The hot and cold gases are mixed in the chamber below, and by increasing the supply of cold air through the annular space after the drier is well started the correct supply of hot air to the mold is assured without the risk of burning.

The drier can be kept always ready for use, and a great improvement is effected by causing the air to pass downward through the fire, the carbon and smoke being consumed, instead of being deposited in the mold, which, when the air is blown up through the fire, is more or less likely to occur.

A PORTABLE CORE OVEN.

Many attempts have been made to design an economical and at the same time efficient portable core oven. Most cores are baked in heavy brick structures which take up an unduly large amount of space, and which cannot be moved or shifted, as development in the department requires more space or a change in the general arrangement of the plant.

The accompanying illustration shows a drawer oven which is self-contained and economical. The one shown is equipped with four drawers, supported by rollers at the back and by pipe guides at the front. The drawers are removed from the oven by slipping a pair of handles into the pipes shown in the front, lifting them slightly and running them forward by means of the wheels on the inside at the back of the shelves, the action being much like that of a wheelbarrow. The shelves are self-sealing, in that when they are drawn forward a plate closes the opening, so that the baking of the cores on the other shelves goes on without interruption. In the illustration the shelves are shown open and drawn to different distances, so as to illustrate the variety of cores which can be baked in an oven at one time. The large cores on the lower shelf are 7 inches in diameter.



PORTABLE CORE OVEN.

This oven was run for an entire day on one bucketful of fine coke or breeze, swept up in the coke bin. The consumption of fuel in an oven of this kind would naturally be less than the other types, as the space

is all utilized to the greatest possible extent, there being no ducts or passages in which radiation takes place. The fact that the fronts of the doors drop down as shown enables the core plates to be taken out easily.

These ovens can be distributed about the core department, thus minimizing the distance the coremakers have to walk to put their cores in the oven, and a rearrangement of the department can be effected very easily, as the portable oven is no more difficult to move than the core bench.

In an experimental run the temperature was found to be 450 degrees in practically all parts of the oven, and this temperature was easily maintained the entire day on the amount of coke already referred to.

One point in this oven to which especial attention should be called is the provision for supplementary shelves dividing the main drawers into divisions. As shown in the illustration, the two highest drawers are divided into three shelves each, the next into two and the bottom one is arranged without any supplementary shelves. The facility with which these different divisions can be put in will enable the operator to dry any size of cores readily.

This device was designed by George H. Wadsworth, of Cuyahoga Falls, Ohio, who has applied for patent on the same, and is manufactured by The Falls Rivet & Machine Co., Cuyahoga Falls, Ohio.

THE SILVERITE ANODE.

The Zucker & Levett & Loeb Company, of New York City, are placing on the market their silverite anode, which is the latest effort in anode construction. As will be seen from the engraving, it is formed with columns extending downward from a cross bar, like the teeth of a comb. By reason of this arrangement it exposes to the solution a very large metal surface of extremely light weight and insures long life to the anode and very little waste of metal. Owing to the quality of metal used in its construction a silver white surface is obtained which is most desirable. These anodes, which have been patented, are made with the company's pure malleable wire hooks cast-welded to them, or with their patent cast hook in one piece, or with the older form of ears intended to be used with regular copper hooks. The anodes are made of any length desired.

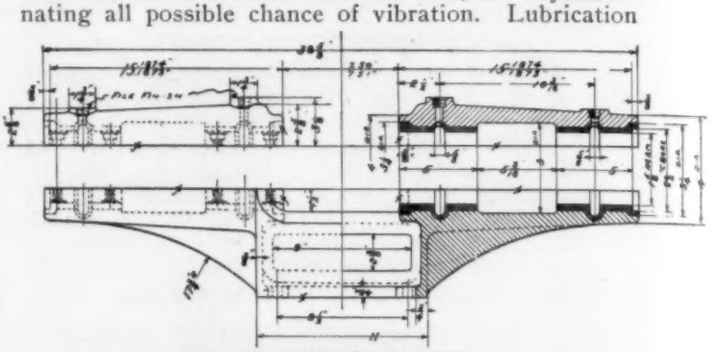
SILVERITE ANODE.

MACHINERY OBSOLETE.

The machinery of the New Orleans Mint has been pronounced to be of an obsolete pattern and entirely inadequate for the work expected of it. An expert of the Philadelphia Mint has been selected by the Treasury Department to superintend the coinage of 5,000,000 twenty-cent pieces for the Mexican Government. He pronounces the opinion that the work of coining these pieces will be slow as compared with what it would be at the Philadelphia Mint, where there are twenty-one coinage presses of improved pattern, capable of rapid work. Only about 35,000 pieces can be coined per day and at the present rate it will be three months before the order can be filled. The order for this job was first sent to San Francisco, but the earthquake compelled its being sent to New Orleans. The opinion is that modern machinery should be placed in the New Orleans Mint, both on the score of economy and rapidity of execution.

THE DOW D-60 POLISHING LATHE.

As will be seen from the accompanying sectional view, this polishing lathe, which is built by the Dow Chemical Manufacturing Co., of Mansfield, O., has a spindle which is supported by four separate and distinct bearings, each 5 inches long. Two of these are located on each side of the lathe head, thereby eliminating all possible chance of vibration. Lubrication



THE DOW POLISHING LATHE.

is accomplished by means of an oil ring in each of the four bearings. By this arrangement the spindle is running in oil at all times and needs but occasional attention to fill the oil recesses in the head.

The height from the base to the center of the spindle is 38 inches; length of the spindle over all, 54 inches; diameter of the spindle in the boxes, 1⅝ inches; diameter of the spindle between flanges, 1¼ inches; distance between wheels, 40 inches; weight, 430 pounds.

ENDLESS POLISHING BELTS.

The Ames Sword Company, of Chicopee, Mass., are the manufacturers of an admirable endless sewed polishing belt. These belts are 4-ply and made from the best quality of duck, with lapped seams. They run very smooth, cut quickly and are the best adapted for either sand or emery. They are made in widths from 1 inch to 4 inches and in any length desired.

ENDLESS POLISHING BELT.

PITTSBURG FOUNDRYMEN TO BE GUESTS OF THE S. OBERMAYER COMPANY.

The latest addition to the present large manufacturing capacity of the factories of The S. Obermayer Co. is their new plant at Rillton, Pa. This makes a total of five being operated by them for the manufacture of foundry facings and supplies, located as follows: Cincinnati, Chicago, Pittsburg, Larimer, Pa., and Rillton, Pa. Rillton is only a short run out of Pittsburg, and located right in heart of the Westmoreland district, and on the line of the Pennsylvania R. R.

The Pittsburg Foundrymen's Association are to be the guests of the Obermayer Company in June on a tour of inspection of this new plant.

As guests of the company the association will have the opportunity of inspecting the largest and most modern factory of its kind in this or any other country. A special train has been chartered and the trip promises to be a most enjoyable one.

During the year 1906 Brazil exported gold to the amount 4,547,940 grams, as compared with 3,879,000 grams in the previous year.

THE S. H. CRUCIBLE FURNACE.

By W. H. Kane.

In these days of great variety of pattern in melting furnaces, and the vast diversity of claims made for each type, a few facts of what can be done with the S. H. furnace may interest your readers.

This S. H. furnace is a forced draft crucible furnace about three feet in diameter, built to suit any ordinary size crucible, and any number of them can be worked, either individually or collectively, all being connected one with the other and governed by draft dampers direct from the blower, so that the metal is under absolute control, both in the melting and time that it is desired, ready for pouring.

You can very readily see that through this system you have your metal coming all day long (every few minutes if necessary) just as you want it, enabling the molders to finish your orders without waiting for metal and making your shipments promptly on the day they are promised.

I have seen 160 pounds red brass scrap put in a No. 60 crucible and melted down ready for pouring in 45 minutes, with a loss of 1 per cent.; same quantity of yellow brass in 35 minutes.

Turnings, which we all know are always run at a loss in metal, were melted in a S. H. furnace with the minimum loss of any furnace on the market, only 1½ per cent.

In making a test for a neighboring iron foundry on crucible iron they melted 180 pounds in 1¾ hours, which poured the finest crucible iron casting that I ever saw.

Then we hear about the great expense of crucibles under forced draft. Not so with this furnace. It seems to add to their strength, and forms a compact, callous surface that prevents cracking and increases their life. I have seen the Dixon and McCullough-Dalzell crucibles that were in a fairly good condition after running thirty to thirty-five heats apiece.

We have reached a time of improved methods, and the development of this industry has been commensurate with that of other large business interests, but the real improvement, in my opinion, in the method of melting brass has been brought about more successfully through an improved condition of the old and original principles rather than by new devices that lok mechanical and augur well, but which do not save the actual losses or reduce expenses one iota.

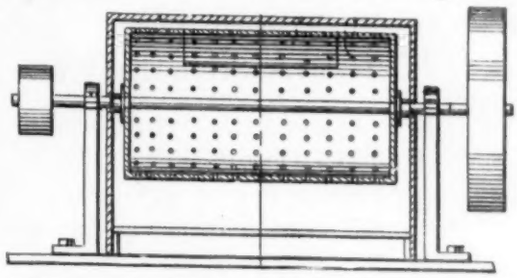
These furnaces are handled by the J. W. Paxson Company, of Philadelphia, Pa.

PROCESS OF COATING IRON WITH BRASS.

A patent granted to Hans Hinrich Baumgarn, of Davenport, Iowa, March 19, 1907, describes a method of coating iron with brass, in order to prevent rusting. The metal to be brass coated is first heated, and while hot a thin coating of pulverized glass is applied to the heated metal. After the glass has thoroughly melted and completely covers all parts of the metal, the brass is applied. Stress is laid upon the importance of first coating the metal with glass before applying the brass, since the most perfect coating can be obtained in that way. The brass may be applied in a melted condition or it may be sprinkled in small particles over the surface. The former method is stated to give the best results. After the brass has been applied the sheet is subjected to pressure by running it through rollers. The foregoing process relates to the treatment of large quantities of metal. In smaller articles the pieces are placed over a hot fire and the glass applied to the surface. Subsequently the brass is placed on this glass-coated surface and heated.

APPARATUS FOR RECOVERING TIN AND SOLDER.

A patent issued to John H. Bills, of Laramie, Wyoming, April 16, 1907, and by him assigned to the United States Tin, Solder & Iron Company, of Denver, Col., relates to an improved apparatus for recovering tin and solder from scraps of tin plate, old cans and like material. The scrap is deposited in the drum of the machine, beneath which a fire is lighted, after



APPARATUS FOR RECOVERING TIN AND SOLDER.

which the hood or shield is placed in position. When the drum becomes sufficiently heated to fuse the tin and solder, rotary motion at considerable speed is imparted to the shaft carrying the drum, thereby causing the molten tin and solder to be expelled by centrifugal action through the appertures of the drum. When thus expelled the molten metal strikes the hood and is guided into suitably placed molds. When the molds have been filled they are removed to cool into pigs or ingots. It will be seen that the principal feature of the invention is in the rapidly revolving drum for expelling the molten tin and solder.

NEW METHOD OF SILVER PLATING.

By the utilization of a patent process of electroplating, Albert H. Kelley, 1241 Resaca Place, Allegheny, Pa., announces that he is able to reduce the cost of silver plating from 50 to 75 per cent. Letters patent No. 850, 944 have been granted to Richard H. Marshall for the exclusive use of this process and of which Mr. Kelley has a half interest. The inventors and owners sell the shop rights for using it and announce that infringements or any attempt to use the process without authority of the owners will be promptly dealt with according to law. Samples of the work will be sent upon request, and correspondence is solicited.

The patent is issued on an electric plating solution containing silver or nickel or a metal of the nickel group. The inventors have thoroughly tested it and sold thousands of dollars worth of goods plated from the solution. They say the lustre is bright and does not tarnish readily. The plate resembles silver to such an extent that it is difficult to distinguish between this new plate and that of pure silver. The owners report that they sell the compound and shop rights for a very reasonable charge.

SILVER PLATED WARE IN BAVARIA.

Consul General W. F. Wright, in a report from Munich, says that silver plated ware of American make is very nearly unknown in Bavaria, and no good reason is apparent why our silver plate manufacturers should not secure a good market there. Plated ware for table use is very popular, and the demand is increasing. The prices obtained are very high, and but little lower than those for which light sterling values could be bought in the United States. In such wares design would be an important factor, but American enterprise should have no trouble in accommodating its ingenuity to a successful result.

EDITORIAL

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THE U. S. STAMPING ACT.

On the 13th of next June the stamping act passed at the last session of congress will become a law. Elsewhere in this issue will be found a very liberal resume of that act; this shows what will be attempted under the provisions of the act, but it does not, of course, display the deficiencies of the act.

As far as possible the act governs and controls the handling and sale of articles of gold and silver, and all the alloys containing either or both of those metals. In one sense it fails utterly to accomplish anything toward the reliable production and sale of articles made of the precious metals, or to even interfere with the present perfect lack of system in the handling of gold and silver goods. And yet the act goes as far as it could toward bettering conditions as they now exist, when any one is free to use gold or silver and mark the product according to his own appreciation of honesty, and with no reference to the actual fineness of the particular product. By a wise provision of the Constitution the Federal Government is prohibited from interfering with the strictly home affairs of the several States—they are to be let alone by the general government to work out their own salvation in their own way, provided they do it without clashing with the rights of the other members of the family. But while the general government cannot interfere with the strictly home affairs of the States, it can exercise some authority over the intercourse between the several States.

We therefore find that the act prohibits the import or export, or the depositing in the mails for transmission, or the delivery to a common carrier, of articles made of gold or silver, or alloys containing either, which are not properly stamped or marked to show the exact degree of fineness of the articles or the percentage of base material entering the mixture. The act gives the variation allowable from the prescribed standard and plainly states that all articles made wholly or in part of gold or silver must be so marked as to show the composition. Non-compliance with this provision or the fraudulent stamping of articles means a punishment by imprisonment or fine, or both, at the discretion of the court. It will thus be seen that the Federal Government has done all in its power to provide for the proper marking of articles containing the precious metals.

It will also be noted that there is nothing in the act to prohibit the manufacture and sale of any composition, under any name or designation, provided the entire transaction is carried on in one State. As the matter now stands a manufacturer in New York City can make and sell what he pleases, according to any rule or regulation he sees fit to establish, and this act will not interfere with him. But he cannot export such articles, nor can he deposit them in the mails, nor can he deliver them to a common carrier for transmission outside of the State. The dealer in spurious goods will find his business hampered to just that extent; he can make in his own village, sell in his own village, but he cannot do business outside.

We find that in order to overcome the lack of scope of this act the several States are now taking up or have taken up the matter of State legislation along similar lines. In practically all of the States which have agitated the question at all the bills introduced have been copied very closely after the congressional one. It has been recognized that if this act could be made to apply to the States individually, the matter of the handling and sale of gold and silver articles would be solved. With the assistance to be afforded by the State legislatures it is more than probable that the ignorant purchaser of plated ware will know just how much precious metal there is in the articles he buys.

But with all this accomplished the control of articles of gold and silver will still be far behind, in efficiency, that now obtaining in both England and France. The congressional act, and as far as we have been able to ascertain, the State acts, makes no provision for the testing or examination of gold or silver articles by properly constituted officers of the State. Each manufacturer marks his product himself, and unless action is taken against him is not responsible to anyone. Such is not the method in England, the hall mark system of which we described in our last issue, nor does it approach the French system, which we outline elsewhere in this issue. In both of those countries the handling of gold and silver articles is under rigid rules which are enforced, the consequence being that the stamping of those countries is accepted as true the world over. We very much fear that this will not be the case with the working of our own laws; still the act is a step in the right direction and if found inefficient it can be extended.

A VALUABLE MONOGRAPH ON LAKE VS. ELECTROLYTIC COPPER.

In England the names used to designate the different brands of copper might be taken to indicate, or at least refer to, the grade, but in the United States we have the arbitrary names "lake," "electrolytic" and "casting," and of these the first two mean the method of production and have nothing to do with the quality; the last being an inferior grade useful only for casting purposes. The first two have always varied in price and during the past three years lake has sold at a slight advance over electrolytic. In order to produce this inequality in value, this distinction in name, there must be some variation in origin, method of production, or properties; and since no difference in properties is apparent to the casual observer, these questions naturally arise: How and where do these two varities of copper originate, and by what methods are they produced?

With this issue we present the last of a series of articles on this subject by Andrew M. Fairlie, chemist of the Tennessee Copper Company, which commenced with the January number. In these articles no attempt has been made to cover minutely the mineralogy, chemistry and metallurgy of copper; nor has there been any attempt to provide the specialist with new facts or the metallurgist of experience with original ideas. The aim has been, rather, to furnish information of interest and value to the consumer of copper—to the manufacturer, the roller, the caster, and others who work the metal. Mr. Fairlie has succeeded in producing a monograph on the subject which, while necessarily condensed, is wonderfully explicit upon all those divisions into which the subject naturally divides. Essential details have not been sacrificed to brevity. Accuracy has been carefully guarded.

After the introduction the second chapter deals with the principal sources of North American copper, covering the Lake, Montana, Utah, Arizona and Mexico districts. This examination shows that the earth contains two distinct classes of material: First, copper ores, or chemical combinations; and second, rocks containing virgin copper, free and uncombined. The nature of these two deposits has resulted in the development of two different methods of extracting the metal.

The third chapter takes up the production of lake copper, which is described at some length. Blister copper is treated in the next installment. In the final chapter, which is presented in this issue, electrolytic refining is considered.

Mr. Fairlie has a very happy way of expressing his thoughts, and a brief style which renders his articles attractive reading. It would be well for all our readers, interested in any way in the metal copper, to first read carefully these five articles, and then file them for reference; they should be read, studied and preserved.

ON TO PHILADELPHIA.

It is a common saying before a political convention that "it is all over but the shouting," and the coming convention of foundrymen at Philadelphia, May 20th-24th, may be said to be all over but the attending. The arrangements are perfected for the instruction and entertainment of members and it now rests with the members (and those who wish to become members) to prove by their presence that they appreciate the work of the officers and committees who have planned the educational show.

As the attendance of the iron foundrymen promises to be the largest in the history of that organization, we trust that the brass men will show their iron brothers that they can form a technical society which will be as valuable to the brass interests as the American Foundrymen's Association has been to the iron. In our former issues and in this issue we mention how fortunate a brass society is situated that it can meet with the iron foundrymen, thereby having the experience and the privileges of the conventions of the American Foundrymen's Association upon which to build their own society. Therefore, everyone who believes in the formation of a brass technical association should make up his mind to go to Philadelphia and do his part in making the new society an unqualified success.

COPPER IMPORTS AND EXPORTS.

According to the Bureau of Statistics the value of copper imported into the United States in 1906 was over $37,000,000, including $6,750,000 worth of copper ore. On the other hand the United States exported in the same time over $90,000,000 worth of that metal, of which $85,000,000 represented ingots, less than $2,000,000 ore and between $4,000,000 and $5,000,000 copper manufactures. The importation of such large quantities of copper, nearly all of which comes from Canada and Mexico, apparently grows out of the fact that this country has superior smelting and refining facilities. A considerable part of the $37,000,000 worth of copper imported is re-exported.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES
PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

DEPOSITION OF METALS ON NON-CONDUCTING SURFACES.

To the Editor of THE METAL INDUSTRY:

We have read with interest the article on silver deposit on glass and porcelain by Mr. Dimes in THE METAL INDUSTRY, January issue. We are at present doing this work, and using glass made by the different manufacturers. Owing to the different compositions of the glass itself we are meeting with considerable difficulty in obtaining a white color on the inside of the silver deposit. We have tried the red oxide of mercury which you advise, and find that it gives a much whiter finish than the boric fluxes that are generally advised. On the other hand, we cannot make the silver and mercury adhere satisfactorily to the glass. Can you advise us how to overcome this difficulty? We use the Flogel kiln, and can obtain any heat that may be required. The kiln itself seems to be satisfactory. In using our boric flux we obtain a fairly white deposit on some glasses, and have no difficulty in making it adhere to the glass, but when we insert the article into the plating bath it turns brown or black on the inside of the silver. We have tried different strengths of cyanide in the solution, but have so far been unable to overcome the difficulty. Perhaps you can advise us on that point also. We have been told by a friend in New York that some makers paint with the flux alone at first, and after firing the flux paint again with the silver and oil, then firing the second time. We have not yet had time to try this experiment, but it seems contrary to all chemical principles.

March 30, 1907. THE HEMMING MFG. CO.

Since writing the above we have experimented further with the red oxide of mercury, and find that although subjected to the furnace heat four times as long as the boric flux we were unable to make it run, and after cooling off we were able to wash it thoroughly, not leaving a mark upon the glass. From this we would suppose that the red oxide of mercury does not act as a flux for adhering the silver to the glass. Another point that is mentioned in the article is that the silver should be powdered in water. This we find impossible, as when we rub it in the water it becomes flaky. In other words, we reverse the operations of grinding.

H. M. Co.

TINNING TACKS.

[We recently received a query regarding the method of tinning tacks. This was referred to Mr. Churchill, who replies as follows.—Ed.]

To the Editor of THE METAL INDUSTRY:

On examination of the samples submitted I should say they were coated either by boiling in a tin solution, and probably in contact with zinc, or plated by means of plating barrels, all of these processes being now used for the purpose, and the one to be recommended would depend on the quantity of work to be handled and whether continuously.

To coat by self-immersion the work would first be pickled to remove all scale, rust, etc., then thoroughly rinsed in clear water and boiled in the following solution: Crystallized ammonium-alum, 7 ozs.; crystallized stannous-chloride, 2.8 drachms; fused stannous-chloride, 2.8 drachms; water, 10 qts. After a few moments boiling remove and brighten by tumbling in sawdust.

To coat by immersion in contact with zinc provide a zinc retaining vessel (perforated), place work in this; pickle in a dilute sulphuric of hydrochloric acid pickle (1-20), then rinse and immerse in: Tartar, 3.5 ozs.; stannous-chloride, 14 drachms; alum, 3.5 ozs.; water, 10 qts. This solution should be boiling hot.

The latter method will give a heavier coating, and either requires addition of tin salts as used.

If your correspondent has enough of this work to warrant the equipment, the plating barrel method will prove most satisfactory. Dipping in molten tin can be done, but I would not recommend the process for this class of work, as it is more wasteful of metal than necessary for the purpose.

W. L. CHURCHILL.

JEWISH METAL WORKERS.

Commenting upon the capabilities and possibilities of the Russian Jew, the American Hebrew says that most of those who come over here are qualified to rank as skilled workers in brass, copper and bronze. The most evident example of this service is the artificer of brass and copper, the Russian metal worker who can be found in certain portions of the East Side of New York City.

The most evident example of this latter service is the artificer of brass and copper, the Russian metal-worker who can be found in certain portions of the East Side. The working of bronze and copper and brass into utensils and ornaments is one of the most common industries of the Russian villager, who, engaged for years in the industry, has reached such a standard in his work as compares more than favorably with that of other nationalities. Drinking vessels, teapots, samovars, candlesticks are turned out with the most artistic workmanship by the East Side Jew, who has adopted the industry from the Russian, and now equals, if he does not excel him, in the finish of his work.

The metal utensils and instruments which he makes find their way into many a home in New York City and country, the inmates of which are accustomed to regard the Jew as a native of the parasitic industries, trading, peddling, commerce, and who would be astounded if they were told that such finished artistic products were the work of Russian Jews, speaking an unintelligible Jargon, whom they regard as an ignorant alien.

The port of Smyrna receives $80,000 worth of watches and clocks every year. Germany supplies the greater and cheaper portion of the clock trade, Austria and the United States furnishing the remainder in better grades. Watches are imported chiefly from Switzerland and France, the United States getting but a very small part of this trade. Watches and clocks of expensive pattern are very little in demand—in fact, the trade is so small that it may be ignored. The population is poor and luxuries of any sort cannot be afforded.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—We have an inquiry from a friend who desires a metal or alloy for experimental work in connection with the working parts of an internal combustion engine which, when heated by the products of combustion, should be comparatively non-oxidizable, and should possess a high tensile strength at a dull red heat.

A.—So far as we are aware there is no alloy that possesses a high tensile strength at a dull red heat. Platinum will resist oxidation and metallic silicon might be tried also if it is not too brittle. For gas engine work, Benedict-Nickel (copper 85 and nickel 15) has been used to some extent.—J. L. J.

Q.—Will you kindly let us know something about ovens for tempering britannia metal?

A.—In regard to tempering britannia metal, the several factories make their own ovens. An iron plate with gas jets under is used. Sometimes this is covered to keep in the heat; the metal is laid on the hot iron plate until it is heated to nearly a straw color, then when cooled it will be hard and have quite a ring to it. We know of no one who builds ovens for this purpose. The demand is too small.

Q.—In the making of phosphor-bronze at what stage of the melting is the phosphorus introduced, is it just before the pouring? Also what heat is required for the melting? When scraps are melted what is the percentage of loss, say in 100 pounds?

A.—Melt two-thirds of your copper at a low heat, add the phosphorus by means of a phosphorizer, and then the rest of the copper. Then add the tin or tin and lead, stirring well, and pour into ingots. Phosphorous may be had in sticks or in 1 and 2 pound cakes. When phosphor-bronze is remelted there is practically no loss of phosphorus, but it is advisable to use some new metal with your scrap.—J. L. J.

Q.—Can you give us any information that will enable us to separate the platinum and brass in a quick, thorough and inexpensive manner from electric globes, of which we receive large quantities?

A.—A method that could be pursued would be to melt the brass by means of a blast flame which would volatilize the zinc. The zinc oxide could be condensed and recovered as in the manufacture of zinc white, and the copper and platinum alloy that remained cast into anodes. These, when refined electrolytically, would give high-grade copper, while the anode mud produced would contain the platinum. You should have an assay made of your ingot brass for platinum before deciding on a method of treatment.—J. L. J.

Q.—In the March issue of your paper, page 86, an inquirer asks a question, "What is meant by gold alloy flux mentioned on page 302 of your December issue?" Your answer is that the flux is a composition specially made for china decorators, etc., but you do not give any information as to the ingredients. We would like to know the composition of this flux.

A.—Gold flux is made according to the following formula:

Silver powder	1 oz.
Gold alloy flux	5 dwts.
Nitrate of bismuth	40 grains.
Finely powdered borax	18 grains.

This mixture is ground in equal parts of Dresden thick oil and fat oil of turpentine, and thinned when necessary with refined spirits of turpentine for china and silver depositing purposes.

PLATING AND FINISHING.

Q.—(1) Will you give me some information on the mixing of dips? I would like to get a dip that will brighten brass and composition, without spoiling the plate. I would also like a dip for brass, German silver and copper. (2) I also want a formula for Roman gold on brass, German silver and copper.

A.—(1) A good bright dip can be made by using the following:

Aqua fortis, 38 per cent	1 gal.
Sulphuric acid, 66 per cent	1 gal.
Rock salt	6 ozs.
Water	2 qts.

(2) A good gold solution that will give a fine yellow deposit is made as follows:

Chloride of gold	7 dwts.
Phosphate of soda	6 ozs.
Bisulphite of soda	1 oz.
Cyanide of potassium	⅓ oz.
Water	1 gal.

Dissolve the cyanide in 1 part of water and then add the gold. Dissolve the soda salts in the balance of the water and mix. Use a nearly boiling solution. Anodes of 24 kt. gold should be used. The trouble with your present solution is that you have too much cyanide for the amount of gold.

Q.—Do you know any way I can oxidize sheet steel pieces about 3½ x 9 x 1-16 inch; the steel is bright cold rolled. What I want is the black finish with copper spots through it.

A.—For oxidizing prepare a solution consisting of one ounce of liver of sulphur and ½ ounce ammonia to each gallon of water. This should be used warm. Immerse your coppered steel in the solution for a few seconds or until it turns black. Remove, rinse in boiling water and finish in sawdust. If you have no power to scratch brush and relieve the black, rub the surface with dry sand and then rub off spots with powdered pumice stone and a rag moistened with water. Dry and lacquer. We are of the opinion you will not be very successful in coppering without using the electric current. You might try this method: Prepare a solution of two ounces of sulphate of copper and ½ ounce oil of vitriol to a gallon of water. Moisten maple sawdust with this and apply to the clean steel; this will give you a copper surface by rubbing the sawdust over the article. It is doubtful if the deposit will stand oxidizing.

Q.—I have a dispute which you can settle. What is

needed in the solution when the anodes turn black and the work at times is streaked? Does the silver solution need the addition of metal in chloride form or can it be fed entirely from the anodes? I am only able to suspend about 20 per cent anode surface and am plating with 2½ to 3 volts. Does that take the metal from the solution faster on that account? My disputant claims that the anodes in all solutions should feed them.

A.—Silver baths can not be maintained in operation with the aid of cyanide of potassium only. Your solution is evidently too low in metal and with only 1-5 of anode surface to 4-5 of cathode surface is being constantly robbed of its metal, which is necessary for good results. It is essential to feed all solutions with metallic salts, with probably one exception, that is a gold solution, and then only when pure gold is used in the anode. Black anodes result also from impure silver; some producers guarantee their anodes from turning black.

Q.—I have been experimenting with an electro-zinc solution but have not succeeded in plating it smooth enough for buffing. What I want to do is to make the zinc plating take the place of copper and then nickel plate afterward. Please tell me something about plating zinc upon steel.

A.—We are of the opinion that you will not obtain very satisfactory results in coating steel with zinc and afterward nickelling. It would be necessary to have a specially prepared nickel bath for the purpose. In the regular sulphate-nickel bath zinc blackens even under the influence of the current. If you desire a higher finish upon your work use an acid bath in connection with your cyanide of copper bath. A twenty-minute deposit in this and afterward coloring on the buff will give you a finish upon steel equal to brass. In preparing the acid copper bath use one pound sulphate of copper and two ounces oil of vitriol to each gallon of water; add one ounce glycerine to every ten gallons of solution. This solution is used cold. Articles of iron, steel or zinc must be completely covered in the cyanide of copper bath before immersing in the acid bath.

Q.—Kindly give me a good nickel plating solution for brass.

A.—The article you refer to in the May edition of THE METAL INDUSTRY treats only of the care and replenishing of the nickel bath. You can easily prepare a nickel solution by dissolving in each gallon of water the following chemicals:

Sulphate of nickel and ammonia	8	ounces.
Single sulphate of nickel	1	"
Common salt	1	"

Dissolve the salts in a little boiling water, then add the balance to make up one gallon. This solution works 2½ to 3 volts. Use cast nickel anodes. If you desire the formula for experimental work, use the Hanson & Van Winkle battery No. 1; these batteries give the best results where dynamos cannot be used.

Q.—Can you recommend a good solution for making a deep, absolutely black color on brass, that can be applied without heat? We have tried ammonia black, but it does not come out black enough for the purpose. We want a solution to blacken the ground of metal name plates and for most of our customers the ammonia has up to now answered the purpose; but now we have one that calls for a deeper black.

A.—We are not aware of any other solution that will accomplish this without heat or an electro deposit. The only method we are aware of would be to stain the brass with the ammonia copper solution, then dip lacquer with a dead black lacquer, and polish the high parts in the regular manner. If you can use heat or get a slight copper deposit we may be able to give more information upon the subject.

Q.—I thought you would give me a little advice about my brass solution—sulphate. I send you a tin star from my bath.

A.—The sample would suggest that you have too much ammonia in your bath. Add carbonate of copper and cyanide only, with the addition of a small amount of bisulphite of soda and carbonate of soda, say ½ ounce each to each gallon of solution. Maintain the color of your brass deposit by dissolving carbonate of zinc in ammonia water, at least 26 per cent. When your brass becomes reddish add a little of the zinc ammonia solution; this method makes it easy to maintain a distinct color. The temperature of the solution should not be more than 90 degrees for good results.

Q.—I am having trouble with my nickel solutions plating cloudy on brass, thereby making it very difficult to buff. The trouble seems to be with red brass only; with yellow brass and iron it plates all right.

A.—Nearly all red brass mixtures contain tin. In cleaning with hot potash the tin has a tendency to reduce from the metal and redeposit upon the surface, forming a film of oxide of tin. Sometimes this is almost invisible, but the cyanide cleaning solution does not remove it. Therefore when nickel is deposited upon the surface this cloudy appearance shows beneath it. The best remedy for removing the oxides from red brasses is a 5 per cent solution of muriatic acid in water. This will remove the cloud instantly and no further trouble will be experienced.

Q.—Please send me a receipt for making a very dark and a very light green plating solution.

A.—To a regular gilding bath add a small quantity of cyanide of silver until the color is satisfactory. The solution should be used warm, but not hot. Use a platinum anode for coloring instead of a gold one. For dark bottle green make a strong solution of cyanide and add all the white arsenic it will take up; this should be prepared very hot. When the arsenic-cyanide solution is cold a black solution will be produced. Add a few drops of this mixture to the regular green gold for darker colors. A little experimenting will be necessary for results.

Q.—I want a black finish on steel, like that seen on guns, umbrella heads and first-class novelties. Copper or silver black nickel plating will not do. The work we have on hand now is steel tubing about 3 feet in length and ½ inch thick. The finish must be very nice and lasting.

A.—For producing a carbon black on iron or steel take equal parts of machine oil, boiled linseed oil and lard oil. Coat your previously polished articles with this mixture and then burn off over a charcoal fire. Repeat this operation two or three times, and a fine dead black will be produced that is very permanent.

Q.—We are informed that in one of your issues you gave a formula for cleaning by electricity. Our plating is entirely copper on cold rolled steel; we use both acid and cyanide copper solutions.

A.—The article to which you allude you will find in THE METAL INDUSTRY, issue of October, 1905.

Q.—I would like a silver deposit formula.

A.—As a rule silver solutions contain from one to five ounces of metallic silver (troy) to the gallon. In preparing the solution two ounces of cyanide of potassium is needed to dissolve each ounce of metallic silver prepared as chloride and only one ounce is necessary to dissolve each ounce of silver cyanide. When the bath con-

tains several ounces of silver the amount of cyanide may be somewhat reduced.

Q.—Will you kindly inform me what waxed copper is and how it is produced?

A.—Some idea of waxed copper may be obtained by perusing the short article published in the December, 1907, issue of THE METAL INDUSTRY, page 298, entitled "Egg Shell Finish." Waxed copper is also produced in the same manner as the brush brass finish. The coppered surface is first darkened by sulphuret of potassium, then scratch brushed and scoured. After drying out the articles are immersed in melted paraffine wax or a mixture of beeswax and turpentine. When thoroughly dry they are polished with a goat's hair brush or they may be lacquered with a transparent dip lacquer and then dried and waxed by using a paste of turpentine and beeswax applied to the wheel instead of the article.

Q.—Have you an acid preparation for sale which will produce a substantial patina in a reasonably short time, a formula unlike any given in THE METAL INDUSTRY for the different green finishes during the past eight months?

A.—We have no preparations or materials of any description for sale; our province is to provide the directions only. The formulas we have given under the title of verde antique have given perfect satisfaction when the directions have been carefully followed. If you desire a more copious patina try the following:

Sal ammoniac	5 parts.
Acetic acid	10 "
Common salt	1 part
Cream of tartar	1 "
Acetate of copper	1 "
Water	1 "

Mix these thoroughly and apply with a brush of the sash tool variety. Dry well at ordinary temperature, then lacquer and wax in the regular way. This formula is suitable for brass, copper or bronze.

Q.—Will you acquaint me with a lacquer suitable for polished silver-plated work—something that will stand and not peel off?

A.—Transparent dip lacquers are not, as a rule, very adhesive to polished silver surfaces. This is oftentimes due to an invisible film of grease upon the surface. The peeling may be avoided to a great extent by using a steam-jacketed kettle lined with block tin. Use your lacquer thinner as a cleaning medium and raise it to a temperature of 125 or 150. When the articles are ready pass them through the hot liquid; drain well and finally lacquer in the usual way. If this method does not prove satisfactory purchase your own lacquer in the form of amyl acetate collodion, 6 ounces to the gallon. Use as a thinner or reducer 2 parts of denatured alcohol and 1 part fusel oil. This gives you a cheap thinner and by adding 1 pint of white French varnish cut in wood alcohol or denatured alcohol to the formula given or to your present lacquer you will find it impossible to remove the lacquer unless you use chemical means.

Q.—Will you please let me know how to clean old zinc statuettes ready for replating? They are so hard it is impossible to clean them with brushes and pumice. After they are cleaned should they go to the copper bath, or should they be quickened some way?

A.—In refinishing statuary bronzes made from spelter it is necessary to remove the lacquer by immersing in a weak hot solution of potash. Afterward wash them and pass rapidly through the bright dipping acid, which may be considerably reduced with water for this purpose. One or two rapid immersions will bring the metal to its natural color. Dry out and polish in the regular manner. After polishing remove the dirt with benzine or gasoline. Dry out in sawdust, wire up and clean in the usual way. (Kalye is one of the best cleansers for spelter; it does not act upon the metal and brushing is unnecessary.) Wash and cyanide the articles and immerse directly in the copper bath, which should be made up as follows for plating spelter:

Sal soda	17 ozs.
Bisulphite of soda	14 ozs.
Acetate of copper	14 ozs.
Cyanide potassium	18 ozs.
Water	5 gals.

The bath is used warm. This bath gives a good dense deposit. The blue dip or mercury dip is unnecessary unless you intend to silver plate the articles after coppering, when the following formula will be found valuable:

Cyanide of potassium	2 ozs.
Yellow oxide mercury	¼ oz.
Water	1 gal.

After copper plating and washing a slight immersion will amalgamate sufficiently for silver plating.

Q.—With an acid copper solution standing at 20 degrees, and with a good anode surface, we do not get a good "mat" to the plate—it is too smooth. There is no flaky deposit which would show too much acid. The color comes clean, but is too shiny; we want a "smut" surface.

A.—Reduce your solution to 16 degrees with water, then add ½ oz. sulphuric acid to each gallon of solution. This method will produce a deader surface. It would be advisable to experiment with a gallon or two of your solution first. Results such as you mention arise sometimes from too much acid or not enough. If you find by experiment that the acid is not necessary, ½ oz. of caustic soda dissolved in warm water and added proportionately to each gallon of solution will give results and neutralize the free acid.

Q.—Will you let me know how to flash a rich yellow gold solution on rolled plate gold without polishing after flash?

A.—A gilding solution of the following composition will prove of value for your purpose:

Phosphate of soda	6 ozs.
Bisulphite of soda	1 oz.
Cyanide of potassium	¼ ox.
Chloride of gold	6 drops
Water	1 gal.

Anodes of platinum should be used and the bath maintained by additions of chloride of gold, and very small additions of cyanide, when occasion requires it. The bath should be used at a temperature of 180 degrees. If the color is not sufficiently yellow, prepare a weak silver solution with slight excess of free cyanide. Flash the articles previous to gilding in the silver, and proceed in the regular manner. It is necessary that the articles be chemically clean, as in other plating operations.

Q.—My work plates all right, and comes out of the nickel nice and white, but when it comes out of the hot water it is all stained.

A.—Your solution is evidently alkaline. This will cause the staining you refer to. It is also probably deficient in metal. To overcome your trouble add 2 ozs. of single sulphate of nickel to each gallon of solution in use; this will acidify the bath and increase the metallic content. If the articles should then show stains, make a further addition of 4 to 5 ozs. of sulphuric acid in water to each 100 gallons of solution in use.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.

TRANSLATED AND EDITED BY HOWARD GREEN BAYLES, MET. E.

MOLDING DELICATE OBJECTS.

La Metallurgie describes a method of taking casting molds from delicate objects, or in cases where a patina or carefully finished surface must not be damaged.

A first application is made of leaves, either all of metal or with a metallic surface. The sheets must be sufficiently soft and ductile to conform absolutely to the design that is to be copied. More sheets are applied over the first, the surface conformations being filled and the coating strengthened. A strong backing of wax, plaster or gutta percha is finally put on to give the mold stability. When the backing has become sufficiently hard, the mold is cut and removed in as many pieces as is necessary. Duplicates of the original model are made by painting the inside of the mold with graphite and electrically depositing a positive. This shell is backed and strengthened with lead, etc. For some work a semi-metallic paste may be made by rubbing some fine aluminum powder into a soft wax. This can be used instead of the metallic leaves, as it has the same conducting qualities, or it may be used back of the first leaf.

ALUMINUM AS A PROTECTION AGAINST MERCURY POISONING.

(Journal de l'Electrolyte, etc.)

So far no satisfactory method has been known of guarding against mercury and preventing its entrance into the breathing passages, stomach and pores of the skin. In spite of the rigid maintenance of the most sanitary conditions, free ventilation and short working hours, hundreds of workmen employed in the mining, metallurgy or manufacture of mercury have died painfully from its poisonous effects.

Recently an Italian, M. Tarugi, sems to have found a method of obviating this danger by the use of aluminum. He finds in this metal a strong affinity for mercury, and proposes to provide the laborers with light aluminum helmets, the breathing spaces being covered with a fine gauze made of aluminum wire. This subject is of an importance great enough to warrant careful and thorough trial of any method that offers relief from the conditions now inseparable from work in mercury.

A PROCESS OF MAKING A GRINDING POWDER.

(La Metallurgie.)

A recent invention, of German origin, relates to a new method of preparing a waterproof abrasive, and consists briefly in enclosing each particle of the grinding material in some substance that is not made wet by water. The best substance for this purpose is shellac.

Formerly copal, amber or rosin were used, but these are all inferior. The first two decompose with heat, amber in any case is too expensive, and rosin, when warmed, becomes so sticky that it is altogether unsuitable. By mixing any of these with proper proportions of shellac, however, either by fusion or solution, a substance is obtained which gives very good results in waterproofing. The following is given as one of a large number of receipes that are designed to meet different conditions of work: Ten lbs. of shellac are dissolved in 7 gallons of alcohol. To this solution is added 100 lbs. of abrasive powder. The alcohol is then evaporated off, and the hard mass that is left is is pulverized. Instead of using pure shellac, it may be mixed with any one of a number of substances that are quite useless alone, such as clay, plaster of paris, powdered chalk, zinc oxide, soda, sodium sulphate, dextrine, etc.

BRONZE FINISH.

An excellent method of giving an artistic finish to bronze articles, said to be the one employed for medals in the Paris mint, is as follows:

Mix equal weights of copper acetate and ammonium chloride (verdigris and sal-ammoniac). Of this mixture take two ounces and mix to a thick paste with commercial acetic acid. (Vinegar may be used instead.) Place this in a copper vessel, one that is not tinned inside, with 5 pints of water, and boil for 20 minutes. The water is then poured off and saved for future use.

To finish a small article, clean it thoroughly and place in a copper vessel, resting on a piece of wood or glass, so that it does not touch the copper. Pour in enough of the prepared solution to cover the object completely and boil for 15 minutes. If desired, the high points of the object may be brightened by the careful use of a rag wheel. When the desired finish is reached it is rendered permanent with lacquer, as usual.

TINNING ALUMINUM.

A correspondent of *Der Metallarbeiter* asks for a method of tinning aluminum. The reply is of sufficient interest to translate in full.

"This problem has presented many obstacles to the investigator before a practical method that could be commercially utilized was devised. It has finally been found that the only way is to use an intermediate coating of copper, and this must be made as firm as possible. A sufficiently heavy copper coating can be given only by the electrolytic process. A satisfactory solution is made by adding one volume of nitric acid, (1.3 S. G.) to 17 volumes of 10 per cent copper sulphate solution. The best adhesion is obtained when the aluminum is given a matte surface before plating. This is done concurrently with the unavoidable cleaning by immersing the article in a bath of hot concentrated caustic soda until it has a white, blistered appearance. If left in too long the metal becomes rougher and assumes a dirty gray color. This can be washed off in nitric acid, followed by rinsing in clean water. The longer the immersion in the soda solution, the rougher the surface of the aluminum, and if sufficient time is allowed it will be finally all corroded away. The bath for tin plating is a matter of accuracy, as much depends on this point. Three parts of tin chloride and 9 parts of caustic potash are dissolved in 100 parts of water. Add the potash first and warm the water a little until solution is complete, then add the tin chloride. This bath, when in use, must be kept at a temperature between 160 and 190 degrees F. This may be accomplished with a steam or hot water jacket to the tinning kettle, or even by the use of a gas flame. The bath must be of a uniform temperature throughout, however.

"If these conditions are observed, tin plating begins as soon as the coppered article is put into the bath, and in 15 to 20 minutes the coating will be thick enough."

Der Metallarbeiter has stirred up a very interesting discussion as to the relative merits and demerits of iron that is zinc-coated by dipping and that which is electrolytically galvanized.

The chief point made for the electric method is that the coating is applied at practically the temperature of normal use, while with dipping, if it is well done, the iron must reach the heat of the zinc bath. The difference in the coefficients of expansion of the two metals produces a stress in the zinc that is likely to cause flaking. The other side replies that if iron is properly dip-galvanized a true alloy of iron and zinc is formed at the point of joining, thus giving a firmer integration and adhesion than can possibly be obtained with the superficial electrolytic coating.

An English patent recently granted relates to the soldering of metals. For copper, brass and white metals, the flux recommended consists of a saturated solution in hydrochloric acid of one part of aluminum to three parts of zinc. For soldering aluminum, olive oil is used as a flux. The solder used in any case consists of an alloy of 3 parts tin, 1 part lead and 1 part zinc.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN FOUNDRYMEN'S ASSOCIATION. W. H. McFadden, president, Pittsburg, Pa; Dr. Wichard Moldenke, Watchung, N. J., secretary-treasurer. For a number of years previous to the organization of this association there were a number of local bodies of foundrymen who would get together on occasion for mutual protection in regard to prices, labor and for the interchange of information. These gatherings were always successful in good times, but speedily dropped away when prosperity waned. Nevertheless, the value of organization was recognized, and especially in the Eastern portion of the United States was good use made of this mutual co-operation.

Early in 1896 the Philadelphia Foundrymen's Association, which was doing good work for its members, conceived the idea of making the movement more general, and invited the foundrymen of the country to meet in the City of Brotherly Love and get acquainted. The response was instantaneous and a great gathering was royally entertained by the same generous hosts who will again welcome the American Foundrymen's Association and its affiliated organizations this year. The result was the organization of the association forming the subject of this brief sketch, and on May 12, 1896, the society came into being.

On looking over the work the association has accomplished during the eleven years of its existence, the revolution of foundry practice the world over will be found tied up with it and its members. When first organized, with all the interests manifested in the educational side of its work, the dominant idea in the minds of most of those who attended was the question of satisfactorily regulating the labor problem. The price question soon fell by the way, as without the scope of a national organization it was impossible of solution. Hence at every convention committees reported on ways and means of closer and more friendly relations with the men in the shops. Under the leadership of John A. Penton, as secretary, great headway was made in this direction and it was soon found that the labor end of the organization required distinct attention apart from its intellectual and social activity.

By this time the interest of the foundry industry had been fully aroused to the increasing importance of better methods of foundry practice, and hence came a parting of the ways, and the National Founders' Association came into being, with Mr. Penton as its secretary, Dr. Richard Moldenke being elected to take his place in the American Foundrymen's Association. This occurred at the Chicago Convention in 1900; and from then on the question of labor and price has been strictly excluded from the program of the association, its full energies being directed to studying the best methods of producing the highest class of castings at the lowest shop cost. This work resulted in the creation of the Standardizing Bureau of the association, whose work caused the purchase of pig iron to be made by analysis instead of by fracture. This work was taken over by the United States government and the cast-iron drillings, duly standardized, are now distributed by the Government Bureau of Standards. Much work has also been done by the various committees on systems of apprenticeship, or trade schools, on cost systems and on the issuing of a series of instruction papers intended to help the foundryman educate his apprentices. The aim has been toward the production of more and better trained men for the shops.

This association has been the means of the formation of the British Foundrymen's Association, as well as the movement toward the study of foundry practice and problems on the part of the great German foundry and engineering societies. In this country the Association of Foundry Foremen have the friendly co-operation and support of the association, the conventions being held together. The Brass Founders' Association, now being organized, will work along the lines indicated above.

PAPERS TO BE PRESENTED AT THE CONVENTION.

The following is a list of the papers to be presented at the convention to be held in Philadelphia during the week beginning May 20:

"The Carnegie Technical School Foundry," by Director Hammerschlag, Pittsburg, Pa.

"The Training in Foundry Work at Pratt Institute," by Prof. W. C. Stimson, Brooklyn, N. Y.

"Industrial Foundry Education," by Herbert E. Field, Pittsburg, Pa.

"Some Facts Concerning Trade Schools," by W. E. McCarter, Marietta, Ga.

"Comparative Cupola Practice," by W. S. McQuillan, South Norwalk, Conn.

"Cost Accounts," by H. J. F. Porter, New York.

"Copper in Cast Iron," by W. M. Saunders, Providence, R. I.

"Sound, Clean Castings," by David Spence, Franklin, Mass.

"The Layout and Construction of Foundry Building," by Geo. K. Hooper, New York.

"Industrial Betterment," address by H. J. F. Porter, New York.

"Small Points in the Core Room Which are Not Considered," by Geo. H. Wadsworth, Cuyahoga Falls, O.

"Foundry Design and Construction," by F. A. Coleman, Cleveland, O.

"The Gray Iron Business as a Business Venture," by Thos. D. West, Sharpsville, Pa.

"The Steel Foundry as a Business Venture," by W. M. Carr, New York.

"The Malleable Foundry as a Business Venture," by R. Moldenke, Watchung, N. J.

"The Evolution of the Foundry Business," by Edward B. Gilmour, Elizabethtown, Pa.

"Modern Blast Furnace Practice," address by President Edgar Cook, Warwick Iron and Steel Co., Pottstown, Pa.

"Cast Thread Fittings," by Henry B. Cutter, Seneca Falls, N. Y.

"The Supply of Skilled Labor for the Development of Our American Industries," address by Vice-President M. W. Alexander, American Society for Industrial Education, Lynn, Mass.

"The Universal System of Molding Machines," by E. Ronceray, Paris, France.

"A New Method of Preparing Molding Sand," by E. Ronceray, Paris, France.

"Shop Kinks, Short Cuts and Don'ts," by the Cleveland Patten Foremen's Association.

"Manganese in Cast Iron," by Herbert E. Field, Pittsburg, Pa.

"A Few Denatured Brass Foundry Notes," by W. H. Parry, Brooklyn, N. Y.

"Uniform Cost Accounts for Jobbing Foundries," as Recommended by the Jobbing Founders' Association, by the Cost Committee of that Association.

"Dry Galvanizing," by Alfred Sang, Pittsburg, Pa.

"Cupola Linings," by A. F. Spencer, Pittsburg, Pa.

"Standard Methods for Analysis of Cast Iron," by H. E. Diller, Chicago, Ill.

"A Plea for the Apprentice," by W. W. Gebb, Jerome, A. T.

"Notes on Bronze Founding," by C. E. Johnson, Dorchester, Mass.

"Nickel in Cast Iron," by Jas. F. Webb, Elkhart, Ind.

"Design for a Modern Pipe Foundry," by J. B. Nau, New York.

"The Induction Furnace."

In addition a number of papers of special interest to the brass founders, who are expected to form their national association. Titles and papers not ready for publication yet.

It will be necessary for those visiting the convention to obtain a certificate when purchasing their tickets in order to benefit by the reduction in fare on the return trip. The full fare is paid for the ticket to the convention, but the return ticket, on the certificate plan, costs only one-third the regular rate. This plan will not work on some lines which have adopted the uniform two cents a mile rate.

PERSONALS

ITEMS OF INTEREST TO THE INDIVIDUAL.

F. A. Gring has purchased the interest of William T. Adams in the Crescent Brass Manufacturing Company, of Reading, Pa., and will assume the management.

Daniel Hall, manager of Jas. H. Matthews & Co. of Rome, N. Y., has invented a machine for curving sign borders which bends without wrinkling the sharpest curve used in making signs.

Adolph Lewisohn, president of the United Metals Selling Company, has resigned as vice president of the New York Metal Exchange, on account of a difference in opinion on the correct prices of copper. His successor will be elected May 16.

The entire office force from the general manager down of the Aluminum Company of America recently enjoyed a dinner at the Fort Pitt Hotel, Pittsburg, Pa. The dinner was to promote good fellowship among office employes of the company.

Granville W. Wright, of New Boston, Conn., formerly with the P. & F. Corbin Company, has become first vice-president and general manager of the Reading Hardware Company, Reading, Pa. Mr. Wright has had eighteen years' experience in the manufacture of builders hardware, having held a number of responsible positions at some of the largest factories.

W. B. Quigley, of the Rockwell Engineering Company, of 26 Cortlandt street, New York City, has just returned from a two months' visit to Europe, where he visited the foundries in England, France, Germany and Austria. While abroad he arranged with the following firms to represent his company: J. W. & C. J. Phillips, London and Leeds, England; Ph. Bonvillin and E. Ronceray, Paris, and Schuchardt & Schutte, Vienna and Budapest. Mr. Quigley found that the Rockwell furnaces were very well known in Europe and that the condition of trade there is about the same as in the United States, *i. e.*, everybody was rushed. The Rockwell Engineering Company report that they have furnaces in use in the following countries: Canada, Great Britain, Austria, Sweden, France, Venezuela, Argentina, Mexico, Japan and Russia, and are negotiating to supply furnaces to several other countries.

Chairman Howard Evans, of the entertainment committee of the Foundrymen's Association, is making preparations for the shad dinner which is to be a part of the entertainment of the convention of foundrymen in Philadelphia on May 20-24. The shad dinner is planned to take place on the afternoon of Thursday, May 23, when the foundrymen will take a steamer at 2 p. m. from the Arch street wharf, visit the plants of the Cramps Ship Yard and the New York Ship Building Company, and thence steam down the Delaware to Washington Park, where Mr. Evans will have his nets ready, into which are to run the shad and furnish food for the hungry foundrymen, whose appetite by that time will be ready. No doubt there will be shad enough, for an experienced foundry supply man like Mr. Evans will gather them in with silver hooks if they cannot be caught in other ways. For those foundrymen who do not like shad and a dinner on the Delaware, an alternative excursion has been planned to Atlantic City on the same afternoon. Another entertainment which the chairman has provided is a lot of Texas foundrymen, lariats and steers, who will show they can lasso steers in Fairmount Park. Enough fun has been provided for the foundrymen to suit all tastes and fancies.

DEATHS

William J. Johnston, publisher of the *American Exporter*, died suddenly, April 28, at his home in New York. Mr. Johnston had had a long experience in trade journalism and at one time was the publisher of *The Electrical World* and at another *The Engineering and Mining Journal.*

Simeon J. Fox, president of the National Pipe Bending Company, New Haven, Conn., died suddenly March 25, aged 64 years. He had been one of the managing officers of the National Pipe Bending Company for twenty years, having developed the business to its present substantial proportions.

William T. Mersereau died at his residence in Brooklyn, N. Y., April 8. He was in the brass bed manufacturing business in Newark, N. J., with his brother, Jacob Mersereau. Two years ago he opened another factory in Jersey City and was doing a good business when the plant was destroyed by fire, with a loss of $100,000.

Michael Hayman, senior member of the firm of Michael Hayman & Co., metal smelters at 38 Perry street, Buffalo, N. Y., died recently at his home, 178 Bryant street, that city. Mr. Hayman was born in Baden, Germany, in 1848, and came to the United States thirty-eight years ago, settling in Buffalo and engaging in the metal business. His sons, Edgar M. and Oscar M., have had charge of the active management of the business for some time and will continue to look after the firm's interests.

John J. Riley, owner of the iron and brass foundry at Van Brunt and Summit streets, Brooklyn, N. Y., died at Lakewood on April 1. Mr. Riley was born in New York City 61 years ago and when a boy worked in the foundry, advancing step to step in the management until he became the sole owner 12 years ago. He was prominent in the Masonic order, a member of the Brooklyn Lodge of Elks, a veteran fireman and a member of the Modern Science Club. He leaves a widow, two sons and a daughter.

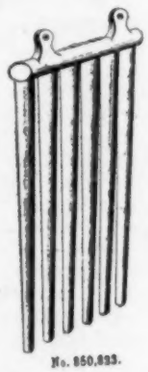
James Old, aged 89 years, died at the home of his daughter in Allegheny, Pa., on March 7. He was born in England and came to this country in 1826. He became an apprentice in the foundry of Andrew Fulton, in Pittsburg, and at the expiration of his time was made foreman. Afterward he resigned that position and formed a partnership with John Naffett under the firm name of Naffet & Old, brass founders and steamfitters, and continued in this business for over 30 years. Mr. Old retired from active affairs about five years ago. He was well known as an inventor of steam valves and appliances.

Theodore B. Starr, one of the most prominent jewelers of New York City, died on the ninth, while visiting relatives in New Jersey. Mr. Starr's ancestors settled in New England among the earliest, Dr. Comfort Starr, the ancestor of the family in America, settling in Cambridge, Mass., in 1635; he was one of the first overseers of Harvard College. Mr. Starr was the son of Col. Elias Starr and Harriet Howard White, and was born August 6, 1837, in New Rochelle. Mr. Starr started in business as an office boy in the old jewelry house of Reed & Taylor. He launched out for himself in 1862 as a commission merchant, and two years later took in Herman Marcus. The firm of Starr & Marcus was well known until 1877, when Mr. Starr purchased the interest of his partner, and moved to Madison Square, the business now being conducted at 206 Fifth avenue. Mr. Starr had the deep and sincere regard of the jewelry trade, and was known for his philanthropy. He was a member of the Union League Club, the Lawyers' Constitutional Club of London, and a life member of the Metropolitan Museum of Art and of the American Geographical Society.

PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

850,823. April 16, 1907. ANODE FOR ELECTROPLATING CELLS. George M. Elliott, of Belvidere, Ill., assignor to the Zucker & Lovett & Loeb Company, of New York city. This invention provides an anode for cells used in electroplating processes, which is light in construction, inexpensive, readily adaptable to cells of different sizes, and of the best wearing qualities. This overcomes many of the objections to the old forms of anodes which



No. 850,823.

were heavy in metal and which had to be of different patterns in order to fit cells of different dimensions. This anode is arranged with a series of teeth or columns depending from a transverse bar or head. To this bar or head are attached the ears or lugs by which the anode may be suspended within the cell. It will be observed that the teeth are made slightly tapering from the top downward, thereby providing a greater mass of metal where the action is strongest.

850,944. April 23, 1907. ELECTROPLATING SOLUTION. Richard H. Marshall, Scottdale, Pa., assignor of one-half to Albert H. Kelley, of same place. This solution for electroplating contains silver and a metal of the nickel group, each being present in the solution in a quantity in excess of any other metal than the metals mentioned.

848,978. April 2, 1907. METHOD OF SOLDERING SHEET METAL PLATES. James Donoghue, of Cleveland, O. This invention has a wide application in the soldering of sheet metal joints. In the ordinary sheet metal lock joint only one edge of the joint is soldered, and expansion and contraction are apt to cause a bend

in the seam. To overcome this objection it is necessary to solder both joints and this is an expensive operation. In the new invention all the parts of the seam are soldered together, and a thoroughly waterproof joint is the result, and also one which will not warp or crack at the bend. This object is accomplished by the use of a prepared strip or ribbon of solder having the same shape as the seam, and which is fitted within the folds of the seam, as shown in the drawing.

849,164. April 2, 1907. PEARL NECKLACE. Bernhard Roede, West Hoboken, N. J. This necklace is so constructed that the pearls are not scattered and lost if the cord on which they are strung breaks. Heretofore the pearls have been guarded from loss, by the breaking of the cord connecting them, by having knots in the cord between the individual pearls. When the cord broke only one pearl was lost. But a serious objection was the unsightly appearance of the knots between the pearls. In this invention the pearls are guarded against loss by a knotted string but the knots are hidden within a small recess made in each pearl. In this arrangement both the cord and knots are entirely concealed.

849,514. April 9, 1907. EQUALIZING SUPPORT FOR MOLDERS' FLASKS. Harris Tabor, of Elizabeth, N. J., and Wilfred Lewis, of Philadelphia, Pa., assignors to the Tabor Manufacturing Company, of Philadelphia. The principal object of the invention is to provide a simple, efficient and reliable equalizing cradle for supporting flasks in such a way that they will be held in proper position, even though they are out of shape or twisted.

848,824. April 2, 1907. APPARATUS FOR EMBOSSING NAME PLATES, ETC. Thomas Hawkins, London, England. This method is applicable for producing name plates and labels of metal. The plate can be embossed with any desired name or lettering, which are already cut to the desired shape and size or produced from a strip, and have holes by which they can be secured in the desired place. The machine employs dies and counterdies of the letters, numerals, etc. A disk is provided for each set of dies, which are arranged in series on radial tongues near to and concentric with its outer edge.

850,829. April 16, 1907. METAL CASTING APPARATUS. Henry Geisenhoner, of Schenectady, N. Y., assignor to the General Electric Company, of the same place. This invention has for its object to provide means whereby molten metal may be forced into a mold without the formation of blow holes in the casting. To accomplish this the metal mold is designed to have very narrow spaces leading out from the metal cavity, through which the air may readily escape, but which will not allow the molten metal to escape or, at most, only in the form of a very thin snag, which may be easily removed. It is immaterial whether the space provided be at the lower or the upper part of the mold cavity, for the reason that the molten metal is forced into the mold at such speed that the full cross section of the cavity is completely filled by the flood of metal through the mold.

850,386. April 16, 1907. SELF-HEATING SOLDERING IRON. Roy Williams Marvell, Philadelphia, Pa., assignor to Bennett-Marvell Manufacturing Company, a corporation of Delaware. In this soldering iron the parts can be quickly taken apart for cleansing. The

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main feature is found in the needle valve, which is so constructed that to a certain extent the extended part is protected from injury by being struck with some object. The air pump is secured to the handle, where it is out of the way and yet always in convenient reach for use. The iron is preferably intended for the use of gasoline.

850,611. April 16, 1907. MACHINE FOR CUTTING OR SHEARING METAL SHEETS OR PLATES. James Abbott, of Newport, England. This invention has reference to improvements in connection with the method hitherto employed for cutting metal sheets of tin, copper, steel, etc. This invention results in saving in time for doing work of this character and at the same time there is stated to be a great increase in the output as compared with the present system.

851,113. April 23, 1907. MOLDING TRUCK. John H. Bickley and James McNally, of Reading, Pa. The object of this invention is to provide a device that may be used as a platform or work bench on which to make up a mold or quickly and easily converted into a truck for carrying the ladle of molten metal. A rectangular frame is mounted on wheels and is provided with means for carrying a ladle in such manner that it is capable of either lateral or vertical adjustment.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The Ross-Tacony Crucible Company, of Tacony, Philadelphia, Pa., report that their business has about doubled in two years.

The Federal Machine Company, of 916 Bouquet street, Allegheny, Pa., have put in recently a brass foundry as part of their shop equipment.

The Bingaman-Savage Brass Company, of 434 Second avenue, Pittsburg, Pa., have decided to put in a plating room. They manufacture brass specialties.

The Royal Silver Plate Company, of Montreal, Can., platers in gold and silver, have moved their plant to more commodious quarters at 57 St. Gabriel street.

McKenna Brothers' Brass Company, Pittsburg, Pa., have put in recently two automatic screw machines built by the Automatic Screw Machine Company, of Cleveland, O.

The Peerless Plating Company, of 210 Canal street, New York City, has been purchased by L. M. Lesch & Company, formerly of 62-64 Elizabeth street, New York.

The Tabor Manufacturing Company, of Philadelphia, Pa., have started running overtime again, now operating their shops until 9 p. m. They report that orders are coming in and increasing.

It is announced that the Bristol Brass Company, of Bristol, Conn., is receiving estimates for an addition to its rolling mill. It will be of brick construction, one story high, 75 x 75 feet, with a tin roof.

Frederick Weaver, formerly foreman of the Wire and Telephone Company of America, Rome, N. Y., has put up a wire mill at Wellstone, O., where he will make copper insulated magnet wire.

The press reports that the Remington Typewriter Company, Ilion, N. Y., are building a new brass foundry, which when finished will allow them to use their present foundry entirely for iron castings.

The Connecticut papers state that the Chase Rolling Mill, of Waterbury, Conn., has bought 300 acres of woodland in Roxbury, the property being known as Mine Hill. It will be used in the manufacture of brass.

R. Plumacher & Sons, platers and finishers, have removed from their old quarters, at 341 East Fifty-ninth street, to much more convenient and larger quarters at 514-516 West Fifty-seventh street, New York city.

Otto Winter, with temporary headquarters at 23 Athens street, San Francisco, Cal., will engage in automobile manufacturing in San Francisco or Oakland, and is in the market for automobile castings, parts and accessories.

Rolled fireless sterling silver, silver solders and anode silver is what the John J. Jackson Company, 91 Mechanic street, Newark, N. J., offers to the trade in a card he has taken in our Directory of Metal Rolling Mills.

The Hofeller Smelting and Refining Company, of 23 Illinois street, Buffalo, N. Y., has changed its name to the Hercules Smelting Company, but has the same management as heretofore. The company are in the market for scrap aluminum and buy and sell various metals.

Tate, Jones & Co., Pittsburg, Pa., furnace builders, have installed recently ten oil furnaces in the Metric Metal Works, of Erie, Pa. The furnaces were of the firm's usual standard type which burn either coal or oil.

The Orange Manufacturing Company, of Newark, N. J., have moved to new quarters at 64-66 Shipman street, where they have much greater space and better facilities for carrying on their business of stamped metal goods.

The Carborundum Company, of Niagara Falls, N. Y., who are ever extending their works, are now getting plans ready for more buildings, which will be put up during the summer months. At present they are building a new furnace.

Advices from Mexico state that W. B. Carroll, of Guadalajara, has begun to build a brass foundry at the corner of Tequesquite and Canela streets. It is said the total investment will amount to over $100,000 Mexican money.

John J. Jackson Co., manufacturers of rolled, sterling and anode silver, of 91 Mechanic St., Newark, N. J., are also getting out a *"fireless"* sterling which is suitable for light work and can be easily polished, obtaining a brilliant finish.

The Republic Engineering Company have removed their office to the McChesney Building, Pittsburg, Pa., where their business has been taken over by the Hooven-Owens-Rentschler Company, who build engines and rolling mill machinery.

Ellwood Ivins Tube Works, who have a tube mill at Oak Lane Station, near Philadelphia, Pa., report that they are five months behind in their orders. They draw tubing up to 3½ inches and special sizes in steel and the non-ferrous metals.

The Goldschmidt Thermit Company have established a Pacific coast branch at 432-436 Folsom street, San Francisco, Cal., under the management of L. Heymemann. The company have also moved their New York City office to the West street building, 90 West street.

The Pope Metals Company, formerly at 120 Liberty street, New York city, buyers of metal drosses, copper scrap and dealers in tin, antimony, copper, lead, have moved to the new West street building where they occupy large and roomy offices on the twenty-first floor.

The Niagara Falls Brass Works, Buffalo, N. Y., announce that they are in a position to make prompt shipment of automobile castings for automobile work and are pleased to submit samples of what they can do in aluminum castings. They recently made a six cylinder casting for an automobile firm.

In every issue of THE METAL INDUSTRY our "Want Ad." page contains opportunities of buying and selling metals, machinery and supplies of all kinds. Also chances to obtain good positions or competent employes from superintendents to workmen. It will pay all of our readers to watch our trade want page.

White & Brother, Inc., 1505 East Montgomery avenue, Philadelphia, Pa., smelters and refiners, are building a copper refinery plant at Bridesburg, Pa., near Philadelphia. The company at present make a specialty of ingot metal, according to specifications and requirements, particularly red and yellow brass.

T. B. Hagstoz, Ltd., smelters and refiners, of 709 Sansom St., Philadelphia, Pa., due to a prosperous business, have acquired the property in the rear of their present building to increase their present plant. Mr. Hagstoz intends using the electrolytic process of refining, as it is quicker and better.

The Corn Products Refining Company, whose executive offices are at 26 Broadway, New York City, are to manufacture their own tin cans. Two plants are to be erected—one at Granite City, Ill., and the other at Davenport. Heretofore the company have bought most of their cans from the American Can Company.

In our Directory of Metal Dealers, Smelters and Refiners A. Keiffenheim & Sons, Newcastle-on-Tyne, England, offer high-grade composition ingots according to specification; cheap red and yellow brass ingots, manganese bronze ingots for bearings and for gear wheels, plastic bronze ingots with high percentages of lead.

The Frankel Display Fixture Company, 27 Vestry street, New York city, makers of wax figures, papiermache forms and nickel and brass display fixtures, have greatly increased their floor space and yet are seeking more room. These additions are made necessary by the great increase in the business of the company.

The brass foundry department of the William Cramp & Sons Ship and Engine Building Company, of Philadelphia, Pa., have received a duplicate order for Parson's manganese bronze forged axles and piston rods for the United States reclamation service, and which were described in the December, 1906, issue of THE METAL INDUSTRY.

S. H. Shimer & Co., of Philadelphia, Pa., smelters and refiners of metals, have captured a government order for 166,592 pounds of spelter 99.36 per cent pure at 9 cents a pound. They are also selling the Aluminum Company of America all the zinc that they use, and are making the Hobson manganese zinc, bearing metal and other alloys.

L. H. Gilmer & Co., 504 Arch street, Philadelphia, Pa., makers of polishing belts and sellers of polishing machinery, report that they continue to sell their endless belts all over the world, having received recently orders from Germany, France and Australia. They are also selling in San Francisco. The company are agents for the Adamite Abrasive Company, of Newark, N. J.

The McCullough-Dalzell Crucible Company, of Pittsburg, Pa., take great interest in collecting statistics relating to plumbago and have likewise at hand interesting information about crucibles and crucible manufacture. They report that they are the only crucible firm which import their Ceylon plumbago direct and not through agents. Business continues very brisk with this company.

The American Nickeloid & Manufacturing Company, Peru, Ill., are offering to the plating trade basket anodes, the object of which is to use metal in its cheapest form and have no waste. With the basket anode either grain nickel or scrap may be used. The nickel anodes are said to be practically indestructible and the first cost is reasonable. Further particulars may be had from the company.

The Empire Metal Company, of Syracuse, N. Y., have built a fine new smelting plant at 820 East Water street. The shop is a two-story brick building 50 x 125 and is equipped with crude oil furnaces put in by the Gilbert and Barker Manufacturing Company, 82 John street, New York, for the melting of metals. The new plant doubles the company's output of babbitt metals, solder, phosphor tin and their metallic flux for galvanizing.

The Hercules Metal Co., of 23d and Hamilton Sts., Philadelphia, Pa., have a unique business in the separation of metals. They buy iron mixed with brass and non-magnetic metals, and clean them from the iron. They have already contracted for 5,000 tons of this material, and also iron with bronze and babbitt. They have special machinery to clean metals, grindings, dirt—in fact, recovery of mixed metals by magnetic separation.

The Peerless Smelting and Refining Company, Allegheny avenue and Richmond street, Philadelphia, Pa., report some very successful tests of their Peerless white bronze for the bearings of road making machines. The Peerless people have just finished a new office which will give them room in their old quarters for shipping purposes. They have also put in a melting kettle which will hold 30,000 pounds, furnishing a carload lot of uniform metal at one melting.

For twelve years the New York Brick & Paving Company, of Syracuse, N. Y., have been manufacturing a high-grade, acid-proof, vitrified, non-absorbent brick suitable for acid tanks, plating room and other places where acid-resisting flooring and siding are desired. The company announce that these bricks immersed for several months in a 50 per cent solution of sulphuric acid show no signs of deterioration. They believe that they could be used in many plating and dipping rooms to advantage.

A curious condition of affairs exists at Manitowoc, Wis. The Aluminum Foundry Company of that place have been greatly hampered in their business by their inability to induce skilled labor to settle there. The matter has been taken up by other manufacturing concerns in the city and the Manitowoc Boiler Works have advertised for 100 men and have promised steady employment at good wages. Other firms will follow this course and by this means it is hoped to bring a large force of desirable help to the city.

The Jas. A. Spargo Wire Company, of Rome, N. Y., have bought thirteen acres of land alongside the New York Central tracks, where they are building a concrete and steel wire mill 100 x 300, a power house 60 x 100, all of which are to be finished by next September, when the company will move in their new shop and sell their old plant, which is located near the center of the town. They manufacture bare and tin copper wire. The new Spargo mill will have one of the Bates-Peard annealing furnaces.

A large manufacturing plant will be erected at Ellwood City, Pa., during the coming summer. The works will be built by The Ellwood Malleable Company, composed of prominent business men of that place. Two bronze foundries will be constructed. The company has just been incorporated and has received a charter from Delaware, but all the operations will be conducted in Pennsylvania. The incorporators are Frank C. Dambach, Henry J. Hendicks and W. J. McKean of Ellwood, and Ira W. Logan of Rochester, Pa.

A. E. Hobson, of Meriden, Conn., has of late invented several silver alloys of which manganese is a constituent. He is now putting on the market, through his sales agent, G. R. Schofield, 635 Quincy street, Brooklyn, N. Y., the Hobson manganese bearing metal, for which is claimed superior qualities. The makers announce that a shaft enclosed in this metal has run at the rate of 2,500 revolutions per minute every work day for three months without oiling. The makers advise, however, occasional oiling of all bearings. They solicit trial orders.

Aluminum consumers who have difficulty in getting sheet metal can get prompt deliveries from J. H. Jolley & Co., 42 North Fifth street, Philadelphia, Pa., who report that they are now well stocked with ingot, sheet, rod, wire and tubing. They have a stock of sheet from No. 8 gauge to No. 34 inclusive, and rod of ⅛ to 1 inch diameter for free turning and drilling. Wire they carry from No. 8 to No. 20. They have sheets as large as 30 x 60 for auto bodies, also samples of extruded aluminum, and are marketing a new aluminum solder.

The E. H. Mumford Company, Seventeenth and Callowhill streets, Philadelphia, Pa., will exhibit at the Foundry Convention in Philadelphia on May 20-24 the new Mumford sand screening and supply device for molding machines. This will be the first time it has been shown to the public. The object of the device is to supply riddled sand in a shower to molding machines and this is accomplished by using sections of light tubing between the double screen, which tubing acts as scrapers and holds the sand between the top and bottom screen.

Albert Russell & Sons Company, of Newburyport, Mass., manufacturers of double and single acting pumps, and iron and brass castings, have given the contract for the erection of their new foundry building to Hatch Brothers of the same city. The contract for the steel work has not as yet been let, but it will probably be given to the Eastern Bridge & Structural Company of Worcester, Mass. The equipment will be installed by the Whiting Company of Harvey, Ill. The company make brass castings of all kinds and are making a specialty of high grade bronze tablets.

The Electro-Metallurgical Company at Niagara Falls, N. Y., will within a few months give up their present quarters and move to the works of the Union Carbide Company, where a part of the works is being reconstructed for their use. The Metallurgical Company now occupy the building formerly used by the Niagara Research Laboratory. The company will continue to make ferro alloys at the Union Carbide plant. Their headquarters are now at 157 Michigan avenue, Chicago, Ill., and they own another plant at Kanawha Falls, W. Va., which was formerly the Willson Aluminum Company.

The Hydeolite Metal Company, of Philadelphia, Pa., manufacturers of "hydeolite" metal, which will take a high polish and will not tarnish, and who also make castings in aluminum and the several kinds of bronzes, are building a new brass foundry in that city. The J. W. Paxson Company, also of Philadelphia, have received the order for the entire equipment, which will consist of 5 furnaces, grating and iron work for the pit; Millett portable core oven; 90 beveled iron flasks with clamps and flask board, brushes, sieves, shovels, bellows, core sand, molding sand, crucible tongs and shanks, sprue cutter, trolley and track, water tumbling barrel and other small supplies.

The W. P. Davis Machine Company, of Rochester, N. Y., have moved their office and store house into their new four-story building, 40 x 140, located at 257 St. Paul street, and adjoining the main line of the New York Central Railroad. In the rear of their new quarters is the pretty Genesee Falls. Next door to the store house they are erecting a machine shop, 140 x 160, of brick and steel with arched roof. Their store house and office is completely equipped with tools, machines, power transmission machinery and factory supplies. They also sell a babbitt melter and are exclusive agents in Western New York for the Brown & Sharpe tools and the E. W. Bliss Company's power presses.

White & Brother, Inc., 1505 East Montgomery street, Philadelphia, Pa., have built an up-to-date copper refinery at Bridesburg, a suburb of Philadelphia, Pa. They have four buildings, engine and boiler room, wash house, a main building containing a modern smelting furnace and a large stable. A siding of the Belt Line, with connections with either the Pennsylvania Railroad or the Philadelphia & Reading runs direct to their storage rooms and close to the sampling house. They are able to handle large and small quantities of materials and are in the market for skimmings, buffings, grindings and all kinds of copper-bearing material. They also have an up-to-date laboratory and analyze all of their own samples. They announce that they have for the trade an excellent grade of ingot copper.

FIRES

A St. Louis, Mo., dispatch states that the brass and iron foundry of the Kingsland-Kay-Cook Manufacturing Company, at Eleventh and Mullanphy streets, has been partially destroyed by fire.

A small fire visited the plant of the James Morrison Brass Company, Toronto, Canada, on April 22. The brass foundry, pattern rooms and molding shops were damaged to the extent of about $3,000. The loss was fully covered by insurance. The regular business of the company will not be seriously interfered with.

MEETINGS

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., the old board, consisting of Edward F. C. Young, John A. Walker, Edward L. Young, William Murray, George T. Smith, Joseph D. Bedle and George E. Long, was unanimously re-elected. The board of directors re-elected the former officers, namely, E. F. C. Young, president; John A. Walker, vice president and treasurer; George E. Long, secretary. Judge Joseph D. Bedle was also re-elected as counsel. The stockholders present expressed themselves as thoroughly satisfied with the management of the company by its officers.

FINANCIAL

Joseph McGee Iron and Brass Foundry Company, of Queens Borough, Long Island, has filed a certificate with the Secretary of State of New York announcing that its capital has been increased from $12,000 to $40,000. The certificate is signed by Fred Russell and John Russell.

The Hazard, Coates & Bennett Company, of Rochester, N. Y., have increased their capital from $300,000 to $500,000 under the laws of the State of New York. The increase was necessary owing to the growth of their business. The company particularly desire to correspond with parties who buy or sell German silver scrap turnings or ingots.

A certificate has been filed with the Secretary of State of Connecticut for an increase in the capital stock of the American Brass Company from $12,500,000 to $15,000,000, which increase was authorized at the eighth annual meeting in February last, and reported in the March number of THE METAL INDUSTRY. The American Brass Company has also made arrangements to have its own leased telegraph wire.

The J. B. Horn interest in the Crown Electric Manufacturing Company, of St. Charles, Ill., has been purchased by Thomas McBride and William McCredie. The plant manufactures brass fixtures and novelties and does a very large business. The industry was first started in Elgin about 10 years ago and was moved to St. Charles because of better inducements made by that city. It is probable that the new management will make many improvements in the line of machinery and buildings.

The American Brass Company, of Waterbury, Conn., have issued $2,500,000 additional of the company's stock, making the present outstanding capitalization $15,000,000. The company was incorporated in Connecticut seven years ago, has an authorized capital of $25,000,000, but has hitherto had only $12,500,000 of the stock outstanding. There is no bonded debt and regular dividends have been paid at the rate of 5 per cent a year since the first, and several times extra dividends have been declared of ½ per cent.

INCORPORATIONS

The Manufacturers' Brass Company has been incorporated in Plainfield, N. J., with a capital of $50,000, by George W. V. Moy, Frank A. Pope, Harry W. Marshall, Lemuel V. Woolson and A. L. C. Marsh, all of Plainfield. The company will deal in brass and other metals.

The American Recording Lock Company has been organized at Portland, Me., for the purposee of manufacturing and dealing in recording time locks, recording locks, bolts, etc. The capital is $600,000. The officers are: President, James E. Manter, of Portland; treasurer, Clarence E. Eaton, of Portland.

The Wetherill Finished Castings Company, of 925 Chestnut street, Philadelphia, Pa., have been fully organized and are now making castings suitable for automobiles, marine and auto

engine parts, and in fact many substitutes for brass. The company use their standard aluminum alloy, which, owing to increased density produced by their process, has a guaranteed tensile strength of over 30,000 pounds per square inch, with a specific gravity somewhat higher than aluminum. For castings requiring anti-friction properties the company uses Parsons' white brass, under exclusive contract with the Wm. Cramp & Sons Ship and Engine Building Company. The company is incorporated under the laws of Pennsylvania, its officers being S. P. Wetherill, president; E. H. Trotter, vice president; J. P. Wetherill, Jr., treasurer and general manager. The paid up capital is $150,000.

PRINTED MATTER

ELECTRIC FANS.—The B. F. Sturtevant Company, of Boston, Mass., have issued a circular descriptive of their electric propeller fans, which are designed for ventilating purposes. These fans are driven by bi-polar and 8-pole motors and are manufactured in diameters from 18 inches to 120 inches.

FOUNDRY FACINGS.—The S. Obermayer Company, of Cincinnati, O., issue a very attractive folder mentioning their facing known as 702 Ceylon plumbago. It is calculated that 5 men losing 5 minutes per day doing needless cleaning of castings, means a loss of $139 per year. This would be saved by the use of this facing.

SPRING PAINTING is the title of an exceedingly neat pamphlet by the Joseph Dixon Crucible Company, of Jersey City, N. J., in which they call attention to their Silica-Graphite paint, which is serviceable for smoke stacks, roofs, cornices, water towers, cars, bridges, etc. It provides effective protection and is claimed to be the most economical paint that has ever been produced.

"WINNING WAYS."—The J. W. Paxson Company, of Philadelphia, Pa., promise great stunts at the coming convention of the American Foundrymen's Convention. They will take your weight, height, age and tin-type, give you a nice little souvenir and sing you a song—all for the pleasure of your company—if you will visit their exhibit of foundry supplies and equipment.

RAINBOW METAL.—A folder by the Peerless Smelting and Refining Company, of Allegheny avenue and Richmond street, Philadelphia, Pa. This anti-friction metal possesses the minimum of friction and is of the greatest service where high speed is required. It melts at a very low temperature and "it runs up" almost as free as water. It can be poured to any degree of heat without shrinking and when cooling it expands just the proper amount.

ADAMITE.—We have received from L. H. Gilmer & Co., 504 Arch street, Philadelphia, Pa., circulars describing the adamite surface machine, also samples of the abrasive adamite. Adamite is an electrical product and the firm sells it in cloth, paper, grains and wheels in all grades desired; also in belts and discs and the various machines used for grinding. The circulars give the prices and testimonial letters of those who have used adamite and the grinding machinery.

ELECTRIC MULTIMETER.—The multimeter manufactured by the Weston Electrical Instrument Company, of Newark, N. J., possesses a very wide range of usefulness in the measurement of electrical quantities. It is an instrument which will accurately serve the purpose of a direct current voltmeter, milli-voltmeter, ammeter, mil-ammeter, ohmmeter, ground detector and Wheatstone bridge. It is nearly as accurate as any of the separate Weston portable direct current instruments having the same ranges.

INCEPTION TO COMPLETION.—Dodge & Day, Drexel Building, Philadelphia, Pa., have prepared a very handsome pamphlet giving an account of their work as engineers. Their "betterment reports" embrace suggestions tending to improve both the equipment and methods of manufacturing establishments. This work has widened so that at the present time they are prepared to undertake the design and superintend the construction of entire plants. Many halftones show the lines along which they have successfully worked.

SCREW CUTTING DIE HEAD.—The Maines screw cutting die head, built by Charles A. Smith, of Germantown, Philadelphia, Pa., can be used for cutting either right or left-hand threads of standard or special pitch. The dies are opened automatically by simply stopping the travel of the carriage or turret slide, and in regular practice the turret top screw is set to govern the travel of the turret, and at the same time the length of the thread to be cut. The chasers are simple in design, strong and durable, and can be duplicated at a small cost.

FUEL OIL BURNERS FOR BRASS MELTING FURNACES.—Tate, Jones & Co., of Pittsburg, Pa., describe their fuel oil burners for brass melting furnaces in a neat circular. By the use of this burner fuel oil may be burned in regular brass melting furnaces originally built for coke. They are so designed as to secure complete combustion. The movement of one lever controls both the oil and compressed air for atomizing, and when more oil is turned on the necessary air to atomize it is supplied by the some movement. This means that there is no oil drip, no smoke and that the oil is efficiently consumed. The oxygen for combustion is provided by an air blast at 2 to 6 ounces pressure.

THE "STEELE-HARVEY" CRUCIBLE MELTING AND REFINING FURNACE.—This furnace and miscellaneous furnaces used in connection with fuel oil, gas and air, are described in a very clear catalogue by the manufacturers, the Monarch Engineering and Manufacturing Company, of Baltimore, Md. This furnace represents the acme of modern ideas in connection with operating with crude oil or natural gas and air. With the use of a furnace of this character there is no waste, no ashes and no oxidation. The furnace is easy to operate and requires no skilled attendant, one man attending to three furnaces. The flame does not bear directly on the crucible, but circulates around the outside of the crucible and within the fire brick wall. This furnace occupies a floor space about 3½ by 4½ feet and they are made to contain Nos. 40, 60, 125, 275 and 450 crucibles.

PYROMETERS.—A very handsome booklet has been prepared by the H. L. Dixon Company, of Pittsburg, Pa., on Price's Perfect Pyrometer, for measuring temperatures as high as 3,000 degrees F. This pyrometer is founded upon the convesion of heat into an electric current, the strength or electromotive force of which indicates the degree of heat. This is accomplished by the electromotive force which is set up when the junction of two dissimilar metals are exposed to different temperatures. The metals here used for the couple wires possess the excellent feature of not increasing in resistance as the temperature is increased. The galvanometer used in connection with the couple is exceedingly sensitive. With these two combinations the records are uniformly perfect and accurate through the whole range of temperature. These pyrometers furnish a refined instrument for obtaining and regulating temperatures in all operations where it is advisable to know the precise temperature of the furnace, oven, etc. With their introduction the days of guesswork are passed and precise methods are placed at the disposal of those requiring known temperatures. The booklet also contains much valuable information and presents tables giving the correct temperatures for such operations as tempering, annealing, melting points, Centigrade and Fahrenheit charts, and the composition of seger cones.

CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matter. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost for analysis or test furnished on receipt of sample.

OFFICE HEADQUARTERS

When visiting New York, the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters, where a writing desk and telephone service will be at their disposal. Every one interested in the non-ferrous metals and alloys is invited to call.

INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our information Bureau is for the purpose of answering questions of all kinds. Send for circular.

METAL MARKET REVIEW

NEW YORK, May 6, 1907.

COPPER.—The London market for standard copper has pretty well recovered from the break in March and we are told that the bear movement in copper in the London market, combined with the low prices given out here by the power behind the metal exchange was turned to good account by a certain well-known selling agent here and considerable copper was picked up abroad at very low prices and will be brought over here to be refined and will show a good profit. The coup was very successful. The price of G. M. B. rose from £97 at the opening of the month of April to £104 10s., the highest point, at the close.

The New York copper market has ruled very quiet. The leading interests have not made any sales of importance and therefore have not changed their price. The market to-day is 25½ to 26 cents for Lake and 25¼ cents for Electrolytic. Casting copper is a different story, and may be quoted at from 23 cents to 23½ cents per pound.

Low priced copper—Lake and Electro—was certainly offered in certain quarters when the London market was being smashed, and had its effect; the market to-day is steadier all around and the lower offers have all been withdrawn. The exports for the month of April were nearly 18,000 tons. We quote the market to-day entirely nominal—Lake and Electrolytic, 25 to 25½ cents; Casting, 23 to 23½ cents, per carload lots.

TIN.—The London bulls have been pushing up the price irrespective of any activity in the New York market and prices in London are nearly £10 higher than a month ago. The shipments from the Straits were rather light—3,729 tons—but it is understood supplies are being held back in the Straits; the deliveries were reported as very heavy, but it is reported tin was shipped from London to Cornwall and was classified as consumed, so that the statistics are not altogether reliable.

The New York market is entirely run by London houses; we have not a dealer or an operator in this market to-day, and consumers have to follow any tune the London bulls like to play. Spot tin to-day for 5 or 10 ton lots is 42 cents, and for forward delivery this price could be shaded 15 to 20 points.

LEAD—The London market has held very steady at between £19 8s. 9d. at the opening to £20 2s. 6d. at the close.

The New York market has become dull and easier. The Trust price stands at 6 cents and the outside market is at about the same level. The premium for spot lead has disappeared and the market has an easier look.

SPELTER.—London spelter stays around £26, with no inducement for buying over here.

The New York market is dull and weak following the easier turn of the St. Louis prices. The New York price is $6.75 nominal and the St. Louis selling price is about $6.35 to $6.40 against $6.75 a month ago.

ANTIMONY.—London prices have broken sharply and the market to-day is nearly £15 lower than a month ago. In the New York market speculators and second hands have bought more antimony than they could find a market for and prices have suffered with very little business resulting. We quote the market to-day: Cookson's, nominal, 22 cents; Halletts, 18¼ cents; Hungarian grade, 18¼ cents.

ALUMINUM.—The same conditions prevail, prices are unchanged, but it is very difficult to get deliveries on any prompt orders. Scrap aluminum is scarce and brings good prices.

SILVER.—The London silver market has ruled rather easier and prices show a decline for the month of about ¾*d*. The New York market has followed the London prices very closely and has to-day an easier tendency, closing at 64⅞.

SHEET METALS.—There has been no change in sheet copper, which stands at 32 cents base. The demand continues good and no signs of any falling off are noticeable for months ahead. Prices for sheet brass are unchanged. An advance over list prices is charged for sheet aluminum, consumers having to pay whatever the manufacturer asks, owing to the scarcity of the material.

The old metal market has been very disappointing. With the break in copper dealers got scared and let go at best prices obtainable. With the turn in the London market in copper it was expected a better demand would spring up, but buyers are shy and the larger consumers are inclined to hold off. Prices are nominally a shade better than the lowest, but there is no buying.

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. Sample copies furnished for the asking.

See Advertising Page 25 following for Trade Wants

Metal Prices, May 13, 1907

METALS.	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER.	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	26.00
Electrolytic, car load lots	25.25
Casting, car load lots	23.00
TIN—Duty Free.	
Straits of Malacca, car load lots	44.00
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig lead, car load lots	6.00
SPELTER—Duty 1½c. per lb.	
Western, car load lots	6.75
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots .....Nominal	50.00
100 lb. lots..... "	49.00
Ton lots ..... "	48.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's cask lots, nominal	22.00
Halletts, cask lots	18.25
Other, cask lots	18.00
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.50
BISMUTH—Duty Free	1.50 to 1.55
CADMIUM—Duty Free	1.55 to 1.60
	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.64⅞
PLATINUM—Duty Free	32.00
QUICKSILVER—Duty 7c. per lb. Price per flask	41.00

OLD METALS.	Price per lb.	
Heavy Cut Copper	20.00	21.00
Copper Wire	20.00	20.50
Light Copper	17.50	18.50
Heavy Mach. Comp	17.50	18.50
Heavy Brass	14.00	14.50
Light Brass	11.50	12.00
No. 1 Yellow Brass Turnings	13.00	13.50
No. 1 Comp. Turnings	15.00	16.00
Heavy Lead	5.00	5.50
Zinc Scrap	5.00	5.25
Scrap Aluminum, sheet, pure	30.00	32.00
Scrap Aluminum, cast, alloyed	25.00	30.00
Scrap Aluminum, turnings	10.00	13.00
Old Nickel, solid	18.00	25.00
No. 1 Pewter	30.00	31.00

	Price per lb.
SILICON COPPER, according to quantity	.37 to .39
PHOSPHOR COPPER, 5%	.25 to .27
Phosphor Tin	.47 to .48
Brass Ingot, Yellow	.15 to .17
Brass Ingot, Red	.18 to .21
Bronze Ingot	.17 to .20
Manganese Bronze	.20 to .22
Phosphor Bronze	.22 to .25

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	8.90
Open casks	9.40

PHOSPHORUS—Duty 18c. per lb.	
According to quantity	.35 to .50

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	32	32	32	32	32	33
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	32	32	33
	Longer than 96 ins.	32	32	32	32	32	34
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	32	32	32	32	32	34
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	32	32	34
	Longer than 96 ins. Not longer than 120 ins.	32	32	32	32	33	35
	Longer than 120 ins.	32	32	32	33	34	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	32	32	32	33	34	36
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	33	35	37
	Longer than 96 ins. Not longer than 120 ins.	32	32	32	34	36	40
	Longer than 120 ins.	32	32	33	35	38	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	32	32	32	33	35	38
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	34	36	41
	Longer than 96 ins. Not longer than 120 ins.	32	32	33	35	38	
	Longer than 120 ins.	33	33	34	36	40	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	32	32	33	35	40	
	Longer than 96 ins. Not longer than 120 ins.	32	32	34	37	42	
	Longer than 120 ins.	33	33	35	40		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	33	33	35	38		
	Longer than 96 ins. Not longer than 120 ins.	34	34	36	39		
	Longer than 120 ins.	35	35	37	41		
Wider than 108 ins.	Not longer than 132 ins.	36	36	38			
	Longer than 132 ins.	37	37	40			

Rolled Round Copper, ⅝ inch diameter or over, 32 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, May 13, 1907

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb.	36c.
12 oz. and up to 14 oz. to square foot, per lb.	37c.
10 oz. and up to 12 oz.	39c.
Lighter than 10 oz.	42c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICES ON BRASS MATERIAL.

In Effect January 21, 1907, and Until Further Notice.

To customers who purchase less than 5,000 pounds per month and over 5,000 pounds per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.22¾	$0.26	$0.28¼
Wire ¼" and larger	.23	.26¼	.28½
Wire smaller than ¼" to No. 8, inclusive	.23¾	.27	.29¼
Wire smaller than No. 8 to No. 10, inclusive	.24¼	.27½	.29¾
Rods smaller than ½" diameter	.23¼	.26½	.29¾
Rods ½" to 1" diameter, inclusive	.23	.26¼	.29½
Brazed brass tubing	.29⅞	—	—
Brazed Bronze and Copper Tubing	—	—	.33¼
Open Seam Brass Tubing	.27⅞	—	—
Open Seam Bronze Tubing	—	—	.31¼
Brass Moulding	.29⅞	—	—
Bronze Moulding	—	—	.33¾

15% discount from all extras.

To customers who purchase less than 5,000 pounds per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.23¾	$0.27	$0.29¼
Wire ¼" and larger	.24	.27¼	.29½
Wire smaller than ¼" to No. 8, inclusive	.24¾	.28	.30¼
Wire smaller than No. 8 to No. 10, inclusive	.25¼	.28½	.30¾
Rods smaller than ½" diameter	.24¼	.27½	.30¾
Rods ½" to 1" diameter, inclusive	.24	.27¼	.30½
Brazed brass tubing	.30⅞	—	—
Brazed bronze and copper tubing	—	—	.34¼
Open seam brass tubing	.28⅛	—	—
Open seam bronze tubing	—	—	.32¼
Brass moulding	.30⅞	—	—
Bronze moulding	—	—	.34¾

5% discount from all extras.

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 27c. per lb.
Seamless Copper Tubing, 32c. per. lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	35	34	29	28	27	27	27	27	27	27	27	28	29	31	33	34

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 Feet. Brass.	Bronze.
⅜ inch	$8.00	$9.00
½ inch	8.00	9.00
⅝ inch	10.00	11.00
¾ inch	12.00	13.00
⅞ inch	14.00	15.00
1 inch	18.00	20.00
1¼ inch	22.00	24.00
1¼ inch	25.00	27.00
1½ inch	32.00	35.00
1¾ inch	45.00	48.00
2 inch	56.00	60.00

Discount 30 per cent.

GERMAN SILVER TUBING.

4 per cent. to No. 19, B. & S. Gauge, inclusive	$0.60
6 " " 19, " " "	.70
9 " " 19, " " "	.85
12 " " 19, " " "	1.00
15 " " 19, " " "	1.15
16 " " 19, " " "	1.20
18 " " 19, " " "	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.
For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 10 per cent.

Prices on Sheet Block Tin and Britannia Metal.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quantity.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than and .. including ..	*3in. 12in. in coils.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.	Cutting to Length.	Polishing or Satin Finishing one Side.
No. 13 and heavier	47	47	49	49	49	49	52	52	52	1	2
" 14	47	47	49	49	49	49	52	52	52	1	2
" 15	47	47	49	49	49	49	52	52	52	1	2
" 16	47	47	49	49	49	49	52	52	52	1	2
" 17	47	47	49	49	49	49	52	52	52	1	3
" 18	47	47	49	49	49	49	52	52	55	1	3
" 19	47	47	49	49	49	49	52	53	56	1	4
" 20	47	49	49	49	49	51	54	55	57	1	4
" 21	47	51	51	51	51	53	56	57	63	2	5
" 22	47	51	51	51	53	53	56	60	64	2	5
" 23	47	51	51	51	53	53	56	62	65	2	6
" 24	47	51	53	55	55	55	58	64	67	2	6
" 25	49	52	54	56	56	56	59	66	70	2	7
" 26	49	52	55	59	59	59	64	68	74	2	8
" 27	49	53	57	61	61	62	67	71	77	2	10
" 28	49	53	59	61	62	62	69	75	80	2	11
" 29	51	54	61	63	65	65	74	80	85	2	13
" 30	51	55	63	65	69	75	82	85	90	2	15
" 31	56	60	68	71	76	84	87	90	96	3	17
" 32	58	62	70	74	82	90	97	103	108	3	19
" 33	60	64	73	78	86	97	104	113	123	3	21
" 34	63	68	75	83	91	104	116	123	133	3	25
" 35	..	78	83	93	103	113	128	138	..	..	..
" 36	..	93	103	113	128	133	148	..	..	..	..
" 37	..	117	121	142	157	172	187	..	..	..	..
" 38	..	137	152	167	182	197	217	..	..	..	..
" 39	..	157	177	197	217	237	..	..	..	..	..
" 40	..	187	217	237	257	..	..	..	..	..	..

*Polished or scratch brushed 2 sides, double above prices.

Advance is asked over list prices owing to scarcity of material.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICES LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11	..	..	96	86	83	77	67	61	61	61
12	..	1.08	96	86	83	77	67	61	61	61
13	..	1.08	96	86	83	77	67	64	64	64
14	..	1.08	96	86	83	77	67	64	64	64
15	..	1.12	96	89	86	80	70	67	67	67
16	..	1.15	99	93	89	83	70	70	70	70
17	..	1.18	1.02	96	93	86	73	73	73	73
18	1.85	1.24	1.05	99	93	86	77	77	77	80
19	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20	1.95	1.31	1.15	1.08	1.05	99	89	86	86	89
21	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb.	43	43½	43½	44	44½	45	45½	46	47	48	49	52	57

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 30 per cent.

Munts or Yellow Metal Sheathing (14" x 48")	22c. lb. net base.
" " " Rectangular Sheets other than Sheathing	24c. " " "
" " " Rod	23c. " " "
Tobin Bronze Rod	25c. " " "

Above are for 100 lbs. or more in one order.

PRICE OF SHEET SILVER—Rolled sterling silver .925 fine. For gauges below 32 B. & S., 2 cents below price of bullion. Above 32 B. & S. gauge from 2 to 4 cents above the price of bullion. Rolled silver anodes .999 fine. 2 cents above the price of bullion. These prices are according to quantity and market conditions.

"BLISS"

The accompanying illustration shows our No 31-S Press, this press is adapted to a wide range of work among manufacturers of enameled iron and tin ware, being suitable for both blanking and combination dies, it is fitted with removable front piece, which makes it also available for horning and wiring, in fact, a press that cannot be beaten for general work.

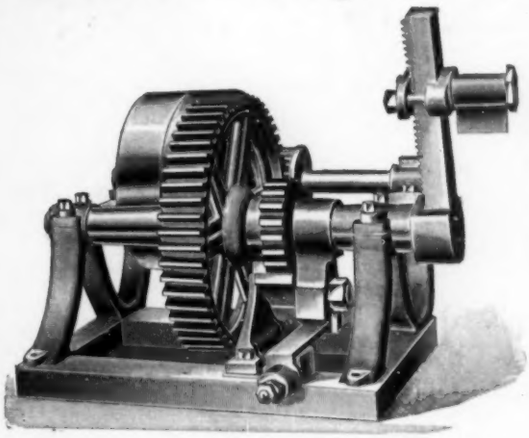
Presses for Every Purpose.

E. W. BLISS CO.

23 ADAMS STREET, BROOKLYN, N. Y.

Agents for Chicago and vicinity—Stiles-Morse Co., 138 Jackson Boulevard, Chicago, Ill. EUROPEAN OFFICE—100 Boulevard Victor Hugo, St. Ouen (Paris), France.

The PECK
Automatic Drop Lifter



Can be readily applied to any drop, and while it increases your output, decreases your pay roll.

We manufacture DROP PRESSES for all purposes and are Specialists in that line.

THE PECK DROP PRESS WORKS

MINER & PECK MFG. CO., Proprietors

425 Chapel St. NEW HAVEN, CONN.

The TORRINGTON MANUFACTURING CO.

TORRINGTON, CONN.

Finishing Machinery for Brass and Copper Mills to Order

Acid Cleaning, Steam and Sawdust Drying-out Machines.
Power Presses, Single and Double Action Cam or Crank.
Flattening, Straightening and Overhauling Machinery.
Multiple Plunger, Cut and Carry Presses.
Slitters, Scrap Cutters and Coilers, in a variety of Styles and Sizes.
Channel Iron Mill Trucks to suit any Requirements.
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For Index of Advertisements See Pages 34-35

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Other tumblers require two operations to dump the contents into a small receptacle—Globe only ONE.

Globe Tumblers

admit of a perfect adjustment in the degree of action on the barrel's contents—this is regulated by the hand wheel. Sheet metal stampings and small castings are tumbled without injury. Occupies little space and can be swept around easily—it's a one legged machine.

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It's the brainiest little magazine we know about. Sample copy free for the asking. Write for IT, and the Tumbler Book.

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Two size machines, No. 1 and No. 2, will take Barrels of all kinds up to 36 in. diameter.

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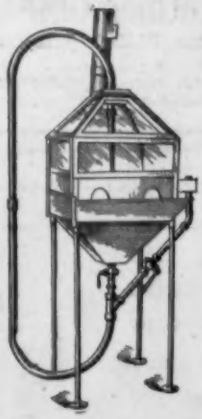
Elevated Position.



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PATENTED SEPT. 16, 1902.

For cleanliness, perfect work and rapidity of action it is without an equal. A trial will cost nothing.

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Correspondence solicited, and all information cheerfully furnished. For full particulars and price address

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Patentee and Sole Manufacturer
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LEIMAN'S NEW SAND BLAST

PATENTED.

SIMPLE, EFFECTIVE, ECONOMICAL.

NEW FEATURES—Let us tell you about them.

RESULTS—Let us show you samples of work done.

IMPROVED HIGH PRESSURE BLOWER

NOISELESS. INEXPENSIVE.

Delivers Greater Volume at Higher Pressure Than Any Other Made.

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Superior to anything domestic. For metal and chemical plants. Absolute proof of this statement. Largest stock in America of any importing house.

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Complete Electro Galvanizing Outfits

without royalty on solution. Electroplating and polishing supplies, complete plants installed, Low Voltage Generators, direct Connected Generator Sets from 50 to 10,000 amperes capacity.

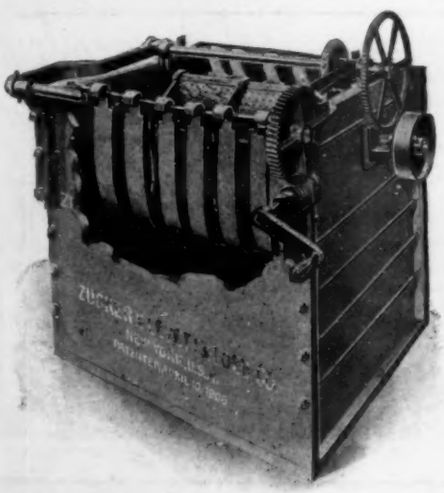
Patent Corrugated Anode.

Patented Corrugated and Silverite Nickel Anodes (Patented), with patented malleable Nickel hook cast solid.

Silverite Anode.

Plating and Polishing at one operation in Nickel, Copper, Zinc, Brass or Bronze

Our patented revolving plating apparatus consists of a wooden tank, containing a hexagonal wooden cylinder which is slowly revolved in the solution. All sorts of small work, such as nuts, bolts, screws, etc., can be economically and quickly Plated and Polished at one operation, labor of stringing also being done away with. The apparatus is fitted with a crank and gear by which the cylinder can be raised out of the solution to receive or discharge work. We make for this apparatus special curved anodes so that the anode surface is at all points equidistant from the work.



We should be pleased to receive small sample lots of work to be plated to demonstrate the practicability of the apparatus, or it can be seen in practical operation at our works. For further particulars and prices apply to the Patentees and Sole Manufacturers

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The accompanying cut illustrates a new model Weston Voltmeter expressly designed to meet the requirements of Electroplaters, Electrotypers and others engaged in the art of Electrometallurgy. It is accurate and thoroughly reliable. It is built in a thoroughly substantial manner; the workmanship is high grade. It is provided with a 15 point switch so that the difference of potential can be determined at any one of 15 tanks or all of them successively.

It is Low Priced and Good.

Special Bulletin describing the instrument and giving prices can be obtained upon application.

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Waverly Park, NEWARK, N. J., U. S. A.

Acid-Proof Brick

FOR TWELVE YEARS

we have been manufacturing a high-grade Acid-Proof Vitrified Non-Absorbent Brick suitable for Acid Tanks, Plating Room flooring, etc., etc.

These brick immersed in a 50% Sulphuric Acid solution for several months show no signs of deterioration.

We also have the same material pulverized to mix with Portland Cement in place of Sand in laying the Brick.

INQUIRIES SOLICITED.

NEW YORK BRICK & PAVING CO.
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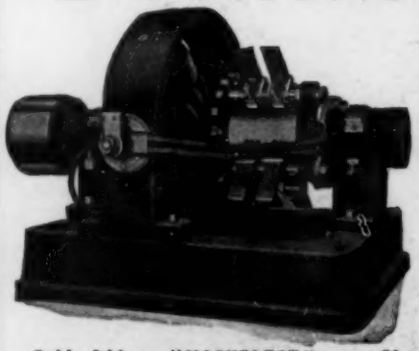

For Electro-Plating, Galvanizing and all other low voltage work.

50-8000 Amperes, 3-30 Volts.

Shunt, compound and separately excited.

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Are "Otto" Engines Dependable?

Gentlemen:

As you will doubtless remember, two years ago last fall, we installed one of your 21 H.-P. "Otto" Gasoline engines, and ran the same **103 days and nights** without stopping. One year ago water was high and the engine was not run. Last fall water was again too low to enter our intake, and the engine and pump was started on November 2, 1906, and has run continuously for 3,523 hours.

Is not this a good record?

Yours truly,
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OTTO OTTO

OTTO GAS ENGINE WORKS, Phila, Pa.

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For a liberal compensation I will teach my process to manufacturers and fit up plants.

I make a specialty of etching plates in steel, copper, brass and zinc for transferring and embossing. Also silverware, including such articles as mirror, brush and comb backs, book and album covers, trays, souvenir spoons and similar articles.

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Are the only ones that have always been of a good uniform quality. We SAVE you trade, worry and money

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CLEANS and POLISHES

All Silverware, Brass, Copper, Gold, Nickel, Zinc, Tin and Enamelware, Glassware, Gas Fixtures, Marblework, Floors, Woodwork, Tile, Onyx, Wall Decorations, etc. :: Non-inflamable

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A HANDFUL OF PIG'S HAIR TIED TO A STICK

to apply your Paint, Japan, Enamel, Lacquer, Bronze, Etc., to your work?

THE OTHER FELLOW

uses our SPRAYERS or AIR BRUSHES, and does better work in half the time. Other trades have progressed, why stick to the brush of the stone age? BETTER WORK AT LESS COST, IF YOU DO IT OUR WAY.

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TURKISH EMERY	POLISHING WHEELS
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Secure our prices before ordering

Cost of Silver Plating Reduced 50 to 75 Per Cent

With better work and work that will not tarnish as rapidly as that plated by the process of plating with pure silver is the verdict of users of R. H. Marshall solution of silver and nickel, Patented April 23, 1907, other patents pending.

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Patent Separator

V. & L. Patent Separator, Hood and Metal Saving Device

HUNDREDS OF THEM IN USE WHY NOT BE UP-TO-DATE?

This Separator is constructed to separate the line and dust from the air. Also can be placed next to the fan and collects material in bottom.

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Patent Hood and Metal Saving Device

Save Money

The hood and metal saving device for polishing or grinding wheels can be attached easily to machine and saves from 5 to 20 lbs. of metal per day.

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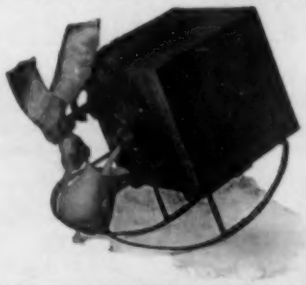

¶ Invest $5 in this Inclinator and save Hundreds of Dollars in Acid Spills. Put on or taken off in a jiffy.

One Does for All Your Carboys — Sent on Approval

CARBOY INCLINATOR CO.

1733 Flora Street, PHILADELPHIA, PA.

SEE PAGE 37 FOR

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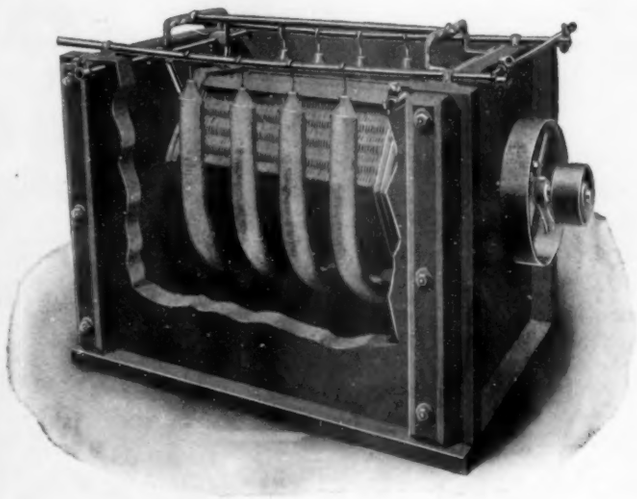
AND SPECIAL OFFER TO SUBSCRIBERS

Mechanical Electro-Plating Apparatus



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The most efficient plating apparatus in the market. Over 400 in use by the trade.

We will furnish sample lots of work without charge.

This apparatus is a proved money saver where small work is to be plated. Can be used in Nickel, Copper, Brass, Zinc and Silver Solutions.

No Stringing. No Wire Used.
No Metal Plating Trays or Baskets.
No Unstringing. No Loss of Metal.
Capacity: 50 lbs. to 500 lbs., according to size.
Basket can be removed at will—without interfering with drive. In larger sizes basket is raised and lowered automatically.
Useful for plating.
Bolts, Nuts, Rivets, Screws, Buckles, Ferrules, Typewriter and Sewing Machine Parts, Lamp Fixtures, Saddlery and Trunk Hardware, Carriage Trimmings, Screw Tops, Shells, Stove Fittings, Locks, Keys and small work.

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Manufacturers of Dynamos from 50 to 5,000 Ampere Capacity, and all Supplies for Electro-deposition

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The object of these Anodes is to be able to use the metal in its cheapest form, and to have no waste.

With our **Basket Anode** either Grain Nickel or Scrap may be used.

These Anodes are practically indestructible and the first cost is very reasonable.

We are always glad to give any further particulars that may be desired.

Back of Anode

American Nikeloit & Mfg. Co.
PERU, ILLINOIS

CIRCULAR FRAME PLATING TANK.

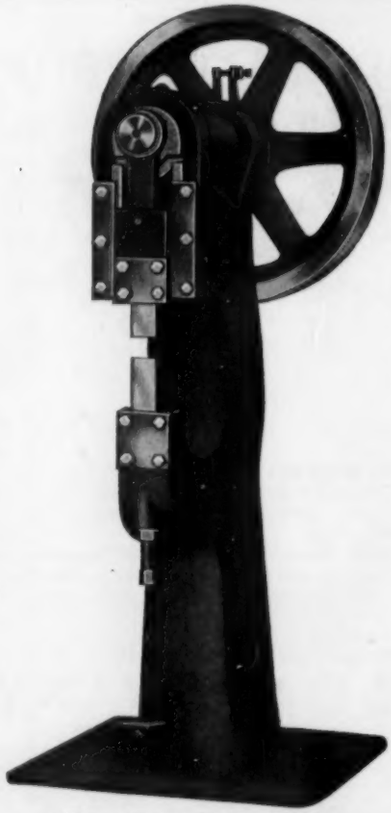
Cut Down Your Plating Costs
BY USING OUR
MECHANICAL ELECTRO-PLATING TANKS.

Produce better work at lower cost than any other method.
No spoiled work.
Can be used with any kind of plating solution.

INVESTIGATE.

Tanks have been in use ten years.
Write for catalog, prices and particulars.
See January issue THE METAL INDUSTRY for full description.
Furnished in either Round or Rectangular style.

SCHREIBER & CONCHAR MFG. CO.,
DUBUQUE, IOWA.



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Is the Shipping Room Idle?

A Power Sprue Cutter Will Hustle Work Through

This machine will cut with ease a sprue ¾ inch square or the equivalent.

It is easily operated. Simply hold the foot treadle down till the work is finished.

The large throat gives ample room for conveniently handling brass castings.

The distance from the front of the cutters back to the frame is 12 inches, and it is 10¼ inches from the top of the lower cutter holder to the bottom of the guides.

Floor space required only 34 x 30 inches.

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It is put up in paste form in paper cartons. It costs less than tallow, besides this composition has cutting qualities as well as producing the softening effect upon the wheel.

Notice the name "Stevens" on each package.

WHITE COLUMBIA COLORING

Prepared and shipped in cakes that just fit the hand. Its use gives a fine finish to nickel plated work and fine brass castings where a higher color is required. It is especially invaluable for use on castings having embossed parts or deep backgrounds. The particles left in the interstices are easily washed out. It is sometimes called "White Rouge." It is put up in brick form and offered at a low figure.

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